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1. Purple Capped Lory. 2. Leadbetter's Cockatoo. 3. Red and Blue Macaw. 4. Ring Necked Parrakeet. 5. Kakapo. 6. Blue-Crowned Hanging Parrot. 7. Rosy-Faced Love-bird. 8. Common Gray Talking Parrot. 9. Rosella Parrakeet. 10. Grass Parrakeet or Budgerigar.

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THIRTY VOLUMES

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No. 1.

SCHEME OF SOUND SYMBOLS

FOR THE PRONUNCIATION OF WORDS.

Note.—(-) is the mark dividing words respelt phonetically into syllables; (′), the accent indicating on which syllable or syllables the accent or stress of the voice is to be placed.

Sound-symbols employed in Respelling.	Representing the Sounds as exemplified in the Words.	Words respelt with Sound-symbols and Marks for Pronunciation.
ā	mate, fate, fail, aye	*māt, fāt, fāl, ā.*
ă	mat, fat	*măt, făt.*
â	far, calm, father	*fâr, kâm, fâ′thėr.*
ä	care, fair	*cär, fär.*
aw	fall, laud, law	*fawl, lawd, law.*
ē	mete, meat, feet, free	*mēt, mēt, fēt, frē.*
ĕ	met, bed	*mĕt, bĕd.*
ė	her, stir, heard, cur	*hėr, stėr, hėrd, kėr.*
ī	pine, ply, height	*pīn, plī, hīt.*
ĭ	pin, nymph, ability	*pĭn, nĭmf, ă-bĭl′ĭ-tĭ.*
ō	note, toll, soul	*nōt, tōl, sōl.*
ŏ	not, plot	*nŏt, plŏt.*
ô	move, smooth	*môv, smôth.*
ö	Goethe (similar to *e* in her)	*gö′tėh.*
ow	noun, bough, cow	*nown, bow, kow.*
oy	boy, boil	*boy, boyl.*
ū	pure, dew, few	*pūr, dū, fū.*
ŭ	bud, come, tough	*bŭd, kŭm, tŭf.*
û	full, push, good	*fûl, pûsh, gûd.*
ü	French plume, Scotch guid	*plüm, güd.*
ch	chair, match	*chär, măch.*
ċh	German buch, Heidelberg, Scotch loch (guttural)	*bôċh, hī′dėl-bĕrċh, lŏċh.*
g	game, go, gun	*gām, gō, gŭn.*
j	judge, gem, gin	*jŭj, jĕm, jĭn.*
k	king, cat, cot, cut	*kĭng, kăt, kŏt, kŭt.*
s	sit, scene, cell, city, cypress	*sĭt, sēn, sėl, sĭt′ĭ, sī′prĕs.*
sh	shun, ambition	*shŭn, ăm-bĭsh′ŭn.*
th	thing, breath	*thĭng, brĕth.*
th	though, breathe	*thō, brēth.*
z	zeal, maze, muse	*zēl, māz, mūz.*
zh	azure, vision	*ăzh′ėr, vĭzh′ŭn.*

OVERBECK, *ō'vĕr-bĕk*, Friedrich: 1789, July 4—1869, Nov.; b. Lübeck; descendant of a line of Prot. pastors: distinguished painter, to whom belongs a large share in the movement from which arose the modern German school of art, and the Christian art of the 19th c. He commenced his studies as an artist at Vienna 1806, as pupil of the pseudo-classical school of David; but, having adopted notions on art essentially different from those inculcated in the academy, he, with some like-minded friends, was expelled; and 1809 set out for Rome. His principle, now and always, was to abjure the classical renaissance and its sensuousness, and to 'abide by the Bible.' In Rome he was soon joined by Cornelius, Schadow, and Veit; and these four laid the foundation of a school that in no small degree influenced the taste for art in Europe, though they were scoffed at as 'Pre-Raphaelites,' 'Nazarites,' 'Church-Romantic painters,' and had long to struggle with poverty. A picture of the Madonna, which O. painted at Rome 1811, brought him into notice, and he was employed, with Cornelius and his other friends, by the Prussian consul, Bartholdi, to execute for his house at Rome frescoes illustrating the history of Joseph—the *Selling of Joseph* and the *Seven Lean Years* being the subjects assigned to him. After completing these, he painted in fresco, in the villa of the Marchese Massimi, five large compositions from Tasso's *Jerusalem Delivered*. In 1813, with some of his artistic brethren, he abjured Lutheranism, and entered the Rom. Cath. Church. O.'s chief work is a fresco at Assisi, *The Vision of St. Francis*. His oil pictures are inferior to his frescoes, being dry and weak in color. Among his famous pictures are: *Christ's Entry into Jerusalem*, at Lübeck; *Christ's Agony in the Garden*, at Hamburg; *Lo Sposalizio*, at Berlin; the *Triumph of Religion in the Arts*, at Frankfurt; the *Incredulity of St. Thomas*, in a private house in London. He executed many drawings and cartoons remarkable for noble feeling, most of which, like his frescoes and paintings, have been engraved. One of his last undertakings, a series of designs from the evangelists, delicately engraved in the line manner, is a work of high excellence. O. adhered closely to those ideas of art with which he started —namely, entire devotion to the style of the Italian artists prior to the period of the renaissance—Fra Angelico, Pinturicchio, Perugino, and Raphael in his early period—and a conviction that drawing in the classic style is inadmissible in works embodying religious subjects. Among the characteristics of the art of the school are devout feeling, hardness of outline, scholastic composition, and the avoidance of merely sensuous beauty both in color and in form. The success of the school in fresco led to a notable revival of the long-neglected art. O. was a devout and saintly man. He wrote poems and essays, and a mass of letters on congenial topics. He died at Rome.

OVERBLOWN, pp. and a. *ō′vėr-blōn′:* exhausted; blown over.

OVERBOARD, ad. *ō′vėr-bōrd:* out of a ship or vessel, as, to fall *overboard;* from on board.

OVERBOIL, v. *ō′vėr-boyl′:* to boil unduly or excessively.

OVERBUILD, v. *ō′vėr-bĭld′:* to build beyond the demand.

OVERBULK, v. *ō′vėr-bŭlk′:* to oppress by bulk.

OVERBURDEN, v. *ō′vėr-bėr′dn*, or OVERBURTHEN, v. *-bėr′thĕn*, to load too heavily. O′VERBUR′DENING, imp. *-dn-ĭng.* O′VERBUR′DENED, pp. *-dnd:* ADJ. excessively loaded. O′VERBUR′DENSOME, a. *-dn-sŭm*, excessively loaded or burdened.

OVERBURY, *ō′vėr-bėr-ĭ*, Sir THOMAS: English author and courtier, whose mysterious death has given interest to his history: 1581–1613, Sep. 15; b. Compton Scorfen, Warwickshire; son of Nicholas O., a Gloucestershire squire. He studied at Oxford, graduating 1598; and joined the Middle Temple. Returning from a tour on the continent, with the reputation of a finished gentleman, he met in Scotland, 1601, Robert Carr (properly Ker), a page in the service of the Earl of Dunbar. Carr —a handsome ignoramus, sensual and unprincipled—unfortunately followed his scholarly friend to London. Carr soon gained the royal favor, and was created Viscount Rochester; and through his influence O. was knighted 1608.

Frances Howard, daughter of the Earl of Suffolk—who had been married (1606), at the age of 13, to the Earl of Essex, only a year older, and who had grown up as a splendid beauty, but utterly devoid of virtue or goodness—having had more than one love-intrigue at court—now cherished a fierce passion for Rochester. When Rochester proposed to get Lady Essex divorced from her husband, and then to marry her, O. (who had helped to bring about their illicit relation) protested that such a creature might do for a mistress, but not for a wife. Lady Essex, hearing of this, became furious for revenge, and offered an enemy of O., Sir David Wood, £1,000 to assassinate him, which offer was declined. Rochester, it has been held, though never proved, was persuaded by his mistress to join in a plot against O., who on a trivial pretext was thrown into the Tower 1613, Apr. 21. O., threatening to divulge certain secrets, was, after several attempts, poisoned. Rochester (now created Earl of Somerset) and his paramour were married Dec. 26, with great pomp. But after George Villiers had supplanted the earl in the royal favor, an inquiry was instituted; sentence of death was executed on four of those concerned in the plot; Somerset and his wife were tried and found guilty of poisoning, but were, by an amazing stretch of the royal prerogative, pardoned. Though the countess was unquestiona-

bly guilty, the complicity of Somerset himself was never proved. O. wrote several works, posthumously published: among them were, *The Wife* (1614), a didactic poem; *Characters* (1614), a work showing wit, ingenuity, precision, and force. See ed. of O.'s works, with Life, E. F. Rimbault, 1856.

OVERCANOPY, v. *ō′vėr-kăn′ō-pĭ:* to cover as with a canopy.

OVERCAREFUL, a. *ō′vėr-kār′fûl:* excessively careful.

OVERCAST, v. *ō′vėr-kăst′:* to spread over or darken, as with a cloud; to sew by running the thread over a rough edge. O′VERCAST′, pp. covered with gloom; sewed over. O′VERCAST′ING, imp. overspreading with gloom; sewing by running the thread over a rough edge.

OVERCAUTIOUS, a. *ō′vėr-kaw′shŭs:* prudent to excess. O′VERCAU′TIOUSLY, ad. *-lĭ.*

OVERCHARGE, v. *ō′vėr-chârj′:* to load or fill to excess; in an *account*, to demand more than is just; to exaggerate: N. *ō′vėr-chârj*, more than is just in an account; an excessive loading, as in a gun. O′VERCHARG′ING, imp. O′VERCHARGED′, pp. *-chârjd′*: ADJ. loaded to excess; charged more than is just.

OVERCLOUD, v. *ō′vėr-klowd′:* to obscure with clouds.

OVERCLOY, v. *ō′vėr-kloy′:* to fill even beyond satiety.

OVERCOAT, n. *ō′vėr-kōt:* a topcoat; a greatcoat.

OVERCOME, v. *ō′vėr-kŭm′:* to vanquish; to subdue; to master; to get the better of; to be victorious; in *OE.*, to invade suddenly; to come over. O′VERCOM′ING, imp.: ADJ. subduing; getting the better of. O′VERCAME′, pt. *-kām′*, did overcome. O′VERCOME′, pp.—SYN. of 'overcome:' to subdue; beat; vanquish; conquer; surmount; overflow; overpower; overthrow; overturn; defeat; overbear; crush; prostrate; overwhelm.

OVERCOUNT, v. *ō′vėr-kownt′:* to rate above the true value.

OVERCOVER, v. *ō′vėr-kŭv′ėr:* to cover completely.

OVERCREDULOUS, a. *ō′vėr-krĕd′ū-lŭs:* too ready to believe.

OVERCROW, v. *ō′vėr-krō′:* in *OE.*, to crow as in triumph.

OVERCROWD, v. *ō′vėr-krowd′:* to put excessive numbers on or into, that is, beyond what safety or health will warrant. O′VERCROWD′ING, imp. O′VERCROWD′ED, pp.

OVER DARWEN, *ō′vėr dâr′wėn* (postal designation, DARWEN): flourishing municipal borough and township of Lancashire, England; amid moorland hills, 3½ m. s. of Blackburn, 19½ m. n.w. of Manchester. Its prosperity has been due chiefly to the abundance of coal, stone, and water in the locality. Cotton manufacture is the staple industry. The 'India Mill,' erected to contain 100,000 spindles, is a stone building in the Italian style, with engine-house, chimney, etc., highly ornamented. The town contains the most extensive paper-staining works in England, several paper manufactories, a calico-printing establishment, and works for manufacture of fire-bricks, tiles, and drain tubes, iron and brass founding, bleaching, machine and reed making. Coal mines and stone quarries give employment to many of the inhabitants. There are several club-houses, a covered market, public baths, and a free library. The central stores of the Industrial Co-operative Soc., erected 1867, at a cost of £10,000, contain a large public hall; and the society maintains science classes, an extensive library, and well-supplied news-rooms. Pop. (1901) 38,212.

OVERDELICATE, a. *ō′vėr-dĕl′ĭ-kāt:* nice or dainty to excess.

OVERDIGHT, pp. adj. *ō′vėr-dīt* [OE. *dight*—from AS *dihtan*, to set in order: Ger. *dichten*, to contrive, to compose]: in *OE.*, dressed or adorned too much; covered over.

OVERDO, v. *ō′vėr-dô′:* to perform or labor to excess; to fatigue; to cook overmuch. O′VERDO′ING, imp. O′VERDONE′, pp. *-dŭn′*, acted to excess; baked or cooked too much.

OVERDOSE, n. *ō′vėr-dōs:* too much at one time of anything: V. *-dōs′*, to give too great a dose.

OVERDRAW, v. *ō′vėr-draw′:* to take out of bank beyond the amount standing to one's credit; to exaggerate. O′VERDRAWN′, pp. a. *-drawn′*, exaggerated, as, an overdrawn statement or description.

OVERDRESS, v. *ō′vėr-drĕs′:* to dress too finely or gaudily; to dress to excess.

OVERDRIVE, v. *ō′vėr-drīv′:* to drive beyond strength. O′VERDRIV′EN, pp. *-drĭv′n.*

OVERDUE, a. *ō′vėr-dū′:* past the time of payment.

OVEREAGER, a. *ō′vėr-ē′gėr:* too eager; too vehement in desire. O′VEREA′GERLY, ad. *-lĭ.* O′VEREA′GERNESS, n. *-nĕs*, excess of eagerness.

OVERESTIMATE, v. *ō′vėr-ĕs′tĭ-māt:* to value too highly: N. too high a value.

OVEREXCITED, a. *ō′vėr-ĕk-sī′tĕd:* excited to excess. O′VEREXCITE′MENT, n. excitement to excess.

OVEREYE, v. *ō′vėr-ī:* in *OE.*, to remark; to observe.

OVERFATIGUE, n. *ō′vėr-fă-tēg′:* too much fatigue: V. to fatigue to excess; to weary out.

OVERFLOW, v. *ō′vėr-flō′:* to fill beyond the brim; to cover with water; to be fuller than to the brim; to run over; to abound: N. *ō-vėr-flō′*, a superabundance; an inundation. O′VERFLOW′ING, imp. O′VERFLOWED′, pp. *-flōd′*.

OVERFOND, a. *ō′vėr-fŏnd:* fond to excess. O′VERFOND′LY, ad. *-lĭ*. O′VERFOND′NESS, too much fondness.

OVERFREE, a. *ō′vėr-frē′:* free to excess; too liberal; too familiar. O′VERFREE′LY, ad. *-lĭ*.

OVERFREIGHT, v. *ō′vėr-frāt′:* to load with too great a burden; to fill too full. O′VERFREIGHT′ED, pt. pp., or O′VERFRAUGHT′, *-frawt′*, filled with too great a quantity.

OVERFULL, a. *ō′vėr-fûl′:* full to excess.

OVERGONE, pp. *ō′vėr-gŏn′:* OE. for 'foregone'.

OVERGORGE, v. *ō′vėr-gŏrj′:* to gorge too much.

OVERGREEDY, a. *ō′vėr-grē′dĭ:* excessively greedy.

OVERGROW, v. *ō′vėr-grō′:* to rise above; to grow beyond the usual or natural size. O′VERGROW′ING, imp. O′VERGROWN′, pp. *-grōn′:* ADJ. increased beyond a natural size. O′VERGROWTH, n. *-grōth*, excessive growth.

OVERHAILE, v. *ō′vėr-hāl′* [OE. *haile*, hauled, drawn: Dut. *haelen*, to fetch, to draw]: in *OE.*, to haul or draw over.

OVERHANDLE, v. *ō′vėr-hăn′dl:* in *OE.*, to mention or treat of too often.

OVERHANG, v. *ō′vėr-hăng′:* to jut or project over. O′VERHANG′ING, imp.: ADJ. hanging over or above. O′VERHUNG, pp. hung over; covered or overcast.

OVERHAUL, v. *ō′vėr-hawl′:* to examine or inspect; to re-examine, as accounts. O′VERHAUL′ING, imp. O′VERHAULED′, pp. *-hawld′*, said of a ship when she is overtaken by another in a chase at sea, as by an enemy or by a govt. vessel for examination.

OVERHEAD, ad. *ō′vėr-hĕd:* above; aloft; in the story or ceiling above; without distinction: ADJ. in *Scot.*, expressing the whole without any separation of parts, as *overhead* flour.

OVERHEAR, v. *ō′vėr-hēr′:* to hear what is not intended to be heard by one; to hear by accident. O′VERHEARD′, pp. *-hėrd′*.

OVERHEND, v. *ō′vėr-hĕnd′* [OE. *hend*, to take—from Icel. *henda*, to seize]: in *OE.*, to overtake; to reach. O′VERHENT′, pt. pp. overtaken; reached.

OVERISSUE, v. *ō′vėr-ĭsh′shū:* to put into circulation a number beyond that authorized, as a bank with their bank-notes; to put into circulation a number beyond that dictated by prudence and ability to pay, as commercial bills of exchange: N. an excessive issue.

OVERJOY, v. *ō′vėr-joy′:* to fill with exceeding pleasure and delight; to transport with gladness: N. transport; ecstasy. O′VERJOYED′, pp. *-joyd′*, filled with exceeding pleasure and delight.

OVERLADE, v. *ō′vėr-lād′:* to load with too great a cargo or burden. O′VERLA′DING, imp. O′VERLA′DEN, pp. *-lā′dn:* ADJ. loaded with too great a cargo or burden.

OVERLAID: see OVERLAY.

OVERLAND, a. *ō′vėr-lănd:* journeying by land, or chiefly by land.

O′VERLAND ROUTE to India: route of about 6,000 m., from England across the continent of Europe and the Isthmus of Suez; about half as long as the voyage round by the Cape of Good Hope, and occupying one-third to one-half the time. The most direct overland route is from London, by Calais, through the Mont Cenis or St. Gothard Tunnel, by rail to Brindisi, thence to Port Said by steamer, and through the Suez canal and Red Sea to Bombay; time, 21 days. A longer route is to Marseilles, Trieste, or Naples, thence to Alexandria or Port Said. The O. R. communication is mainly by the Peninsular and Oriental Company, incorporated 1840. The railway from Suez to Alexandria, by Cairo, was opened 1858; the Suez canal 1869. Passengers who dislike the fatiguing railway journey to Brindisi may embark at London and sail by Gibraltarand Malta, through the canal, to Bombay —now the usual route for merchandise. From Bombay there is railway to Madras and Calcutta; or steamers by the Point de Galle, whence other steamers run to Singapore, Shanghai, Yokohama, etc.; also to the Australian ports. The Orient and other lines of steamers, with slightly varying routes, have rendered the voyage to Australia by the Suez canal very short, compared with its former length. The Euphrates valley railway, if ever constructed, would take its place as part of an O. R. Another scheme for simplifying the voyage to India is by a canal connecting the Jordan valley with the Mediterranean on the one hand, and with the Gulf of Akabah, a branch of the Red Sea, on the other. Swift and direct communication with India is of enormous importance to Britain for military and imperial, as well as commercial, reasons: hence the peculiar interest of the British govt. in Egyptian affairs.

OVERLAP, n. *ō′vėr-lăp′:* in *geol.*, a term used to express that extension or spread of higher strata by which they conceal the edges of those on which they rest: V. to lap or fold over, as when the margin of one thing covers that of another. O′VERLAP′PING, imp. lying one over another, as the slates or tiles on a roof. O′VERLAPPED′, pp. *-lăpt′.*

OVERLARGE, a. *ō′vėr-lârj:* larger than enough.

OVERLAY, v. *ō′vėr-lā′:* to lay too much weight upon; to cover on the surface, as with a metal; to smother by lying upon; to join by a cover or folding over, as two sides of a thing, one over the other. O′VERLAY′ING, imp.: N. a laying or spreading over; a superficial covering. O′VERLAID′, pp. *-lād′*, covered over; smothered.

OVERLEAVEN, v. *ō′vėr-lĕv′n:* to swell out too much; to corrupt.

OVERLIE, v. *ō′vėr-lī′:* to lie above or upon. O′VERLY′ING, imp.: ADJ. resting over or upon something. O′VERLAID′, pp. *-lād′.*

OVERLIVE, v. *ō′vėr-lĭv′:* to live longer than another; to outlive; to survive; to live too long.

OVERLOAD, v. *ō′vėr-lōd′:* to fill with too heavy a burden, or to excess; to put too heavy a burden on. O′VERLOAD′ING, imp. O′VERLOAD′ED, pp.

OVERLONG, ad. *ō′vėr-lŏng′:* too long.

OVERLOOK, v. *ō′vėr-lûk′:* to view from higher ground; to stand on higher ground; to inspect; to superintend; to review; to pass by indulgently; to neglect. O′VERLOOK′ING, imp. O′VERLOOKED′, pp. *-lûkt′.* O′VERLOOK′ER, n. *-ėr,* one who overlooks; a superintendent.

OVERLOUD, a. *ō′vėr-lowd:* too loud.

OVERLYING: see OVERLIE.

OVERMASTED, a. *ō′vėr-mâs′tĕd:* having masts too long or heavy.

OVERMASTER, v. *ō′vėr-mâs′tėr:* to bring into subjection; to govern.

OVERMATCH, v. *ō′vėr-măch′:* to conquer; to be too powerful; to subdue: N. one able to overcome.

OVERMUCH, a. *ō′vėr-mŭch′:* more than necessary: AD. in too great a degree.

OVERNICE, a. *ō′vėr-nīs′:* excessively nice; fastidious. O′VERNICE′NESS, n. *-nĕs,* state of being excessively nice.

OVERNIGHT, n. *ō′vėr-nīt′:* the time when evening is past and night is begun; the night or evening before, as, he came *overnight:* AD. during the night previous; last night.

OVERPAID: see OVERPAY.

OVERPASS, v. *ō′vėr-pâs′:* to neglect; to overlook; to omit; to pass away; to cross or go over, as, he overpassed the limits, etc. O′VERPASS′ING, imp. O′VERPASSED′, or O′VERPAST′, pp. *-pâst′,* passed over or by; passed away; gone.

OVERPAY, v. *ō′vėr-pā′:* to pay too much; to reward more than is due. O′VERPAY′ING, imp. O′VERPAID′, pp. *-pād′.*

OVERPEER, v. *ō′vėr-pēr′:* in *OE.,* to hang or hover above; to overlook.

OVERPEOPLED, a. *ō′vėr-pē′pld:* having too many inhabitants.

OVERPERCH, v. *ō′vėr-pėrch′:* in *OE.,* to fly over.

OVERPICTURE, v. *ō′vėr-pĭk′tūr:* in *OE.,* to exceed the picture or representation.

OVERPLUS, n. *ō′vėr-plŭs* [*over,* and L. *plus,* more]: that which is over and above; what remains after a proposed quantity.

OVERPOST, v. *ō′vėr-pōst′:* to get quickly over.

OVERPOWER, v. *ō′vėr-pow′r:* to bear down or crush by superior force; to oppress by a power greater than can be borne; to vanquish. O′VERPOW′ERING, imp.: ADJ. bearing down by superior force; subduing; crushing. O′VERPOW′ERED, pp. *-pow′rd.* O′VERPOW′ERINGLY, ad. *-lĭ.*—SYN. of 'overpower': to overbear; overwhelm; overcome; conquer; crush; defeat; rout; overthrow; subdue.

OVERPRESS, v. *ō′vėr-prĕs′:* to bear upon with irresistible force; to crush.

OVERPRODUCTION, n. *ō′vėr-prō-dŭk′shŭn:* excessive production; supply beyond actual demand.

OVERRATE, v. *ō′vėr-rāt′:* to estimate at too high a value. O′VERRA′TING, imp. O′VERRA′TED, pp.

OVERREACH, v. *ō′vėr-rēch′:* to extend or reach beyond; to get the better of by cunning; to cheat; to bring the hinder feet too far forward, and strike them against the foreshoes, as a horse is apt sometimes to do. O′VERREACH′ING, imp.: ADJ. cheating: N. the act of cheating by cunning. O′VERREACHED′, pp. *-rēcht′.* O′VERREACH′ER, n. one who cheats.

OVERREAD, v. *ō′vėr-rēd′:* to peruse.

OVERRED, v. *ō′vėr-rĕd′:* to cover with a red color; to redden.

OVERREFINE, v. *ō′vėr-rĕ-fīn′:* to refine with too great subtlety.

OVERRIDE, v. *ō′vėr-rīd′:* to ride beyond the strength of the horse. O′VERRI′DING, imp. O′VERRID′DEN, pp. *-rĭd′n*, ridden to excess. To OVERRIDE ONE'S COMMISSION or POWER, to go beyond one's power or authority; to use such arrogantly.

OVERRIPE, a. *ō′vėr-rīp′:* matured to excess. O′VERRI′PEN, v. *-rī′pn*, to make too ripe.

OVERRULE, v. *ō′vėr-rôl′:* to control by superior authority; to influence and control by irresistible power; to supersede or reject, as, the plea was *overruled.* O′VERRU′LING, imp.: ADJ. exerting superior and controlling power. O′VERRULED′, pp. *-rôld′.*

OVERRUN, v. *ō′vėr-rŭn′:* to cover all over; to spread over and take possession of; to grow all over or to excess, as noxious plants in a district of country; to rove over in a hostile manner; to ravage; to overflow; in *printing*, to change the disposition of types by carrying those of one line into another; to carry over one or more lines from one page to another. O′VERRUN′NING, imp.: ADJ. spreading over; ravaging. O′VERRAN′, pt. *-răn′.* O′VERRUN′, pp. *-rŭn′*, grown over; ravaged.

OVERSCRUPULOUS, a. *ō′vėr-skrô′pū-lŭs:* too nice or exact.

OVER-SEA, a. *ō′vėr-sē′:* foreign; from beyond the sea: AD. abroad.

OVERSEE, v. *ō′vėr-sē′:* to superintend; to inspect with care. O′VERSEER′, n. *-sēr′*, one who superintends or manages an establishment, or some department of it; a parish officer who superintends the parochial provision for its paupers (see below). O′VERSEE′ING, imp. overlooking or superintending.

OVERSEERS, *ō′vėr-sērz′* or *-sē′ėrz:* officers appointed annually, in all the parishes in England and Wales, whose primary duty it is to rate the inhabitants to the poor-rate, collect the same, and apply it to relief for the poor. These officers have important functions in all English parishes. They were ordered to be appointed in each parish first in the reign of Elizabeth. Only householders in the parish are qualified for the office: nomination is usually by the vestry; and appointment always by the justices of the peace. The O. number for each parish two to four. All persons not specially exempted by some statute are liable to serve; even women may be appointed, though they scarcely ever are. The office is compulsory, and entirely without pay: it is an indictable misdemeanor to refuse, without cause, to serve when duly appointed. In some exceptional parishes, and under poor-law unions, the relief of the poor is committed mainly to other officials by local statutes; but, on the other hand, advantage has been taken by the legislature of the existence of the O., always representing the parish, to throw on them miscellaneous duties not directly connected with poor-law affairs.

1. In functions connected with the management of the poor, the O., with the church-wardens, make, once or twice a year, a list of all occupiers of lands and houses in the parish, the property occupied by each, and the ratable amount due by each: they collect and apply the money toward relief of the poor, and kindred purposes. Relief must be given to all the destitute; but a pauper not having a settlement in the parish is removed under legal process to the parish where he has a settlement: see REMOVAL OF PAUPERS. Relief is given, in general, only in the workhouse, and according to certain rules and conditions. Where the parish is included in a poor-law union, as is now generally the case, then the duty of O. in giving relief is confined to urgent cases; since the guardians of the union administer the ordinary business of the workhouse, and of relief generally.

2. Numerous miscellaneous duties are now imposed by statute on O., besides their original duty of relieving the poor. Prominent is that of making out the list of voters in the parish, for members of parliament. Other duties are to make out the list of persons qualified to serve as jurors, the burgess lists when the parish is within a borough, and the list of persons qualified to serve as parish constables. The O. also appoint persons to enforce the Vaccination Acts, give notice to justices of all lunatics within the parish, collect and enforce payment of rates levied for expenses of school-boards, and perform certain duties as to the election of guardians

for the union. They must also bury the dead bodies of persons cast on shore, and of paupers who die in the parish. They must protect village greens from nuisances; and in general act as a board of health (when no such board exists) in the parish (see NUISANCE).—In the larger parishes, the O. are generally relieved of their burdensome office to some extent by appointment by the ratepayers of an *Assistant Overseer*, a payed official.—The duties which in England are performed by O. devolve, in Scotland, on the parochial board, the sheriff-clerk of the county, session-clerk, and others.—For the care of the poor in the United States and other countries, see POOR, THE.

OVERSET, v. *ō′vėr-sĕt′:* to turn upon the side, or with bottom upward; to overthrow; to subvert; to be turned over. O′VERSET′TING, imp. upsetting; turning upside-down; overthrowing; subverting.

OVERSHADOW, v. *ō′vėr-shăd′ō:* to shelter or protect; to cover with superior influence; to throw a shadow over anything. O′VERSHAD′OWING, imp. O′VERSHAD′OWED, pp. *-ōd.*

OVERSHOE, n. *ō′vėr-shô:* a shoe worn over another—applied to a shoe of waterproof material; a golosh. See OVERSHOES, INDIA-RUBBER.

O′VERSHOES, IN′DIA-RUB′BER: footwear for protection against wet; called Goloshes (q.v.) in Great Britain, where they were introduced from America about 1847; though it was some time after this before the trade in them reached much importance, as at first they were clumsily made, and of inferior quality. However, mainly by the exertions of the Hayward Rubber Company in the United States, their quality and appearance were soon much improved, and the demand for them increased rapidly. Many mills for their production were then started in the United States, and several in Great Britain, France, Germany, and Russia. In the populous districts of Great Britain, the demand for these shoes now is not a fifth part of what it was 15 or 20 years ago.

These shoes tend to keep the stockings damp, and the feet uncomfortable, by preventing escape or absorption of perspiration: even when the uppers are almost entirely of some woven texture, and nothing but the sole of vulcanized rubber, they are not wholly free from this fault. Most kinds of rubber shoes have their separate pieces held together entirely by the adhesiveness of the rubber when treated by some solvent, such as turpentine; therefore there are no seams like those in a leather shoe, and this, with the close texture of the rubber itself, is the cause of the discomfort. Their good qualities are their imperviousness to damp, as well as their softness and durability.

The material for this manufacture is prepared by processes in general as follows: (1) the rubber is torn into small pieces, washed, and rolled together in granulated sheets: (2) it is then mixed, by the aid of heated roll-

ers, with the vulcanizing materials, consisting of sulphur, litharge, lampblack, pitch, rosin, and sometimes other substances: (3) the final treatment of the material is after the shoes are made, and consists in subjecting them for nine hours to a temperature of 200° to 300° F. Rubber so treated is said to be vulcanized—for the properties of which, see CAOUTCHOUC. After the rubber is thoroughly mixed with the materials above mentioned, of which sulphur is the most essential, the so-far prepared sheets of material are again rolled out between the heated rollers, till they are of the required thickness for the shoe uppers. For this purpose, the rollers, which are fitted into machines called calenders, are very carefully adjusted. The sheets for the soles are made in the same way; only, in their case, the rollers are so constructed as to produce a certain breadth for the heels of an extra thickness, and to indent the surface with grooves, to prevent slipping. Both soles and uppers for each shoe are cut out separately with a knife, since the material will not admit of a number of these being cut at a time by dies, which, however, is done in the case of the linings, as they are of cotton or wool, and will not stick together by pressure. Thin metal molds are used by the workmen for shaping the separate parts of a shoe—i.e., the rubber parts. The calico or other linings are coated round the edges with some strongly adhesive cement, probably dissolved rubber, and then all the pieces are ready to be put together.

All the work to this stage has been done by men; but women with nimble fingers make the shoes. The lasts are of hollow cast-iron, and some manufacturing companies have many thousand pairs of them. Working with a number of lasts exactly the same, the girl first covers them with the various pieces of lining and insole, all of which are held together by the cement. Returning to the first one, she puts on the various outer pieces of the shoe, sticking them together quickly with a little turpentine at the junctions; and then by way of ornament, still more quickly, runs a small notched wheel along where the seams in a leather shoe are, to finish her work. A clever girl will make 50 pairs a day; a very clever one, 70—i.e., a pair of shoes in 10 or 12 minutes. The next process is to coat the shoes with a varnish which gives them a gloss, and in this the manufacturers aim to excel. Finally, they are put on light iron frames, and exposed to the heat of the vulcanizing chamber. Many distinct kinds of India-rubber boots and shoes are made. Some are very light and low, covering scarcely more than the sole and the toe of the upper; others, for cold climates, have warm felt linings and cover to the ankle.

OVERSHOOT, v. *ō′vėr-shôt′:* to shoot beyond the target; to pass swiftly over; to venture too far, as to overshoot one's self; to fly beyond the mark. O′VERSHOT′, pp. *-shŏt′:* ADJ. having the water falling from above, as on the wheel of a mill driven by water.

OVERSIGHT, n. *ō′vėr-sīt:* a failing to notice; a mistake or neglect; an omission; an inadvertence; superintendence.—Syn.: supervision; inspection; inattention; error.

OVERSIZED, a. *ō′vėr-sīzd′* [*size*, a preparatory coating for walls]: smeared or covered over with too much size.

OVERSKIP, v. *ō′vėr-skĭp′:* to pass by leaping; to escape.

OVERSLEEP, v. *ō′vėr-slēp′:* to sleep too long.

OVERSOON, ad. *ō′vėr-sôn′:* too soon.

OVERSOUL: a term employed by Emerson to designate the Absolute, especially in connections which emphasize the universal and ethical aspects of the Absolute.

OVERSPREAD, v. *ō′vėr-sprĕd′:* to cover or scatter over; to be scattered over.

OVERSTATE, v. *ō′vėr-stāt′:* to state in too strong terms; to exaggerate.

OVERSTEP, v. *ō′vėr-stĕp′:* to exceed. O′verstep′ping, imp. exceeding proper bounds. O′verstepped′, pp. *-stĕpt′*.

OVERSTOCK, v. *ō′vėr-stŏk′:* to supply with more than is wanted or necessary. O′verstock′ing, imp. O′verstocked′, pp. *-stŏkt′*.

OVERSTONE, *ō′vėr-ston*, Samuel Jones Loyd, Lord: one of the most skilful political economists, and the ablest writer on banking and financial subjects that Britain has produced: 1796-1883, Nov. 17; descended from a respectable Welsh family. He was educated at Eton and Cambridge, gaining a thorough knowledge of the classics and of English history and literature. He entered his father's banking-house as a partner, and on his father's retirement he became its head. He had a profound knowledge of the principles of banking, and was far-sighted and sagacious—sometimes perhaps too cautious, but neither timid nor irresolute. He was eminently successful. Loyd entered parliament 1819 as member for Hythe, for which he sat till 1826. Though opposed to all revolutionary changes, he was always a consistent liberal. He was raised to the peerage 1850, with the title Baron Overstone and Fotheringhay.

The first of Lord Overstone's famous tracts on the management of the bank of England and the state of the currency was published 1837, and was followed by others till 1857, in which year all were collected and published, with his other financial writings. The proposal of a complete separation between the banking and issue departments of the bank of England, introduced by Sir Robert Peel into the act of 1844, was brought forward first in these tracts: its adoption has been the greatest improvement hitherto in English banking. Lord Overstone also reprinted, at his own expense, four vols. of scarce and valuable tracts on metallic and paper money, com-

meree, the funding system, etc. Before a committee of the house of commons 1857, Lord O. successfully vindicated the principles and practical working of the act of 1844: his evidence was published 1857.

Lord O. was a zealous opponent of the principle of limited liability, and of the introduction of a decimal system of arithmetic. He was chairman of the Irish Famine Committee 1847, a trustee of the National Gallery 1850, and one of the senators of the Univ. of London, At his death, he left personal estate of more than £2,000,000.

OVERSTRAIN, v. *ō′vėr-strān′:* to stretch too much or too far; to make too violent efforts. O′VERSTRAIN′ING, imp. O′VERSTRAINED′, pp. *-strānd′:* ADJ. strained or stretched beyond the proper limits.

OVERSUPPLY, n. *ō′vėr-sŭp-plī′:* an excessive supply; a supply beyond demand.

OVERSWAY, v. *ō′vėr-swā′:* to overrule; to bear down.

OVERT, a. *ō′vėrt* [OF. *overt;* F. *ouvert*, open—from L. *apertus*, uncovered]: open to view; public; apparent; manifest: in *her.*, a term applied to the wings of birds, etc., when spread open on either side of the head, as if taking flight. O′VERTLY, ad. *-lĭ.*

OVERTAKE, v. *ō′vėr-tāk′:* to come up with, as in pursuit or progress; to catch; to come upon, as punishment; to take by surprise. O′VERTA′KING, imp. O′VERTOOK′, pt. *-tûk′.* O′VERTA′KEN, pp. *-tā′kn*, come up with; caught.

OVERTASK, v. *ō′vėr-tâsk′:* to require too much labor from, either mental or physical. O′VERTASK′ING, imp. O′VERTASKED′, pp. *-tâskt′.*

OVERTAX, v. *ō′vėr-tăks′:* to tax too heavily.

OVERTHROW, v. *ō′vėr-thrō′:* to turn upside down; to upset; to demolish; to vanquish; to destroy: N. *ō′vėr-thrō*, defeat; downfall; ruin. O′VERTHROW′ING, imp. O′VERTHREW′, pt. *-thrô′.* O′VERTHROWN′, pp. *-thrōn′.*—SYN. of 'overthrow, v.': to ruin; defeat; conquer; vanquish; subvert; discomfit; degrade; overturn; prostrate; overcome; rout.

OVERTIME, n. *ō′vėr-tīm:* time employed in labor beyond the usual hour.

OVERTON, *ō′vėr-ton:* parliamentary borough and parish in Flintshire, N. Wales, on the river Dee, 20 m. n.n.w. of Shrewsbury. It is the polling-place for the county. —O. is the name also of villages in Hants, Lancashire, and Wiltshire, and of a parish in Yorkshire, England, and in Lanarkshire, Scotland.

OVERTONES, n. plu. *ō′vėr-tōns:* smaller vibrations which accompany a fundamental note; harmonics.

OVERTOOK: see OVERTAKE.

OVERTOP, v. *ō′vėr-tŏp′:* to rise above; to raise the head above; to surpass; to excel; *figuratively*, to obscure by rising above. O′VERTOP′PING, imp. O′VERTOPPED′, pp. *-tŏpt′.*

are the Yssel, into which the Schipbeek runs, and the Overysselsche Vecht, which falls into the Black Water. Other important waterways are the Dedems-Vaart and the Willems-Vaart canals. The island of Schokland, in the Zuyder Zee, belongs to Overyssel. Pop. (1901) 343,924.

OVERZEALOUS, a. *ō'vėr-zĕl'ŭs:* eager to excess.

O'VIBOS. See Musk Ox.

OVICULAR, a. *ō-vĭk'ū-lėr* [L. *ovum*, an egg]: pertaining to an egg; egg-shaped.

OVID, *ŏv'ĭd* (Publius Ovidius Naso): latest of the distinguished poets of the Augustan age: B.C. 43, Mar. 20—A.D. 17; b. Sulmo, in the country of the Peligni, a mountain people; descendant of an old equestrian family. His birth was in the last year of the republic, and in the year of Cicero's death. He was educated for the bar, and became proficient in declamation. His genius, however, was essentially poetic. His father, having but a scanty patrimony to divide between two sons, discouraged the tendency in the younger to write verses, but in vain. Ovid went, for completion of his education, to Athens, where he acquired a perfect mastery of the Greek language. He afterward made a tour in Asia and Sicily with the poet Macer. It is uncertain whether, on his return to Rome, he ever practiced as advocate. Although by birth entitled to aspire to the dignity, he never entered the senate; his weakness of body and indolence of habit prevented him from ever rising higher than from the position of triumvir capitalis to that of a decemvir, who convened and presided over the court of the centumviri. Ovid's private life was that of a gay and licentious man of elegant culture and literary tastes. The restraint of the matrimonial tie was always distasteful to him; twice married in early life, he soon divorced each of his wives; while he carried on an intrigue with a lady whom he celebrated as Corinna, whose social position is not known. Before his 30th year, he married a third time, and became the father of Perilla, of whom he was tenderly fond. Till his 50th year, he resided chiefly at Rome, in a house near the Capitol, and occasionally visited his Pelignan estate. His society was much courted, and his large circle of distinguished friends included some members of the imperial family. By an edict of the emperor, however, he was, A.D. 9, commanded to leave Rome for Tomi, the modern Kustendje, in Rumania, a town near the delta of the Danube, and on the very limit of the empire. The sentence did not condemn him to an *exsilium*, but to a *relegatio*—or, in other words, he did not lose his citizenship and property, nor was he cut off from all hope of return. The cause of this sudden banishment has long divided the opinion of scholars, since the one mentioned in the edict —the publication of his *Ars Amatoria*—seems strangely out of date, the poem having been in circulation ten years before. The intrigue of Julia, daughter of the emperor,

with Iulus Antonius, son of Mark Antony, was a scandal contemporaneous with the publication of *Ars Amatoria;* and that most demoralizing of books may have seemed to the emperor the glorification by literary art of the corruption which had penetrated the whole Roman social life. Especially may his long-slumbering anger have been aroused against the poet by the second scandal of the intrigue of his granddaughter Julia with Silanus, with which affair, so humiliating to Augustus, Ovid seems to have had some connection as a confidential friend. The misery of Ovid's life on the inhospitable and barbarous shore of the Euxine is commemorated by the poems in the composition of which he found his solace. He became a favorite with the Tomitæ, whose language he learned, and before whom he publicly recited some poems in honor of Augustus. But his devotion to the emperor, and the entreaties addressed to the imperial court by himself and his friends, failed to shorten the term or to change the scene of his banishment; so he died, a citizen of Tomi, in his 60th year. His works which have come down to us, either in whole or in part, appeared in the following order: 1. *Amores,* in three books, revised and abridged ed. of an early series. 2. Twenty-one *Epistolæ Heroidum.* 3. The *Ars Amatoria,* in three books. 4. *Remedia Amoris.* 5. *Nux,* (probably spurious) a remonstrance of a nut-tree against the ill treatment it receives from the wayfarer, and even from its owner. 6. *Metamorphoses,* in fifteen books: this is deservedly Ovid's best-known work. It seems to have been written between the poet's 40th and 50th years, and consists of all the transformations of gods, goddesses, and heroes recorded in legend from the creation to the time of Julius Cæsar, whose change into a star forms the last of the series. 7. *Fasti,* in twelve books, the first six of which are all that remain: the poem is a Roman calendar versified, and describes the appropriate festivals and mythic legends, from materials supplied by the old annalists. 8. *Tristia,* in five books, written in elegiac meter, during the first four years of the poet's banishment; mainly descriptive of his miserable fate, and full of appeals to the clemency of Augustus. 9. *Epistles from the Pontus,* in four books, also in elegiac meter, and similar in substance to the *Tristia.* 10. *Ibis,* a short satire against some traducer of the poet's. 11. *Consolatio ad Liviam Augustam,* held spurious by some critics. 12. *Medicamina Faciei* and *Halieuticon,* dubiously genuine, and of which only fragments remain. Several of his works are entirely lost, the one best known to antiquity being *Medea,* a tragedy.

The poetical genius of Ovid has always been admired. A masterly facility of composition, a fancy vigorous and rarely at fault, a fine eye for color, and a versification very musical in its flow, are the merits which have made him a favorite of poets from Milton downward, in spite of his occasional falsity of thought. He has vivid inventiveness, most unflagging animation, exuberant fancy,

picturesque beauty of description. Of the elegiac meter, he is the acknowledged master, and his hexameters are the lightest in all Latin literature. But Ovid, with all his fervor and vitality, is the poet of luxury. No note of grandeur, of intellectual sublimity, of moral elevation, is ever sounded by him; no line of an ideal humanity, no vision of majestic spiritual beauty, is ever reached or even remotely suggested by his art. The best editions of Ovid's entire works are Burmann's (Amsterdam, 1727), and Merkel's (Leipzig, 1884); while excellent commentaries on one or other of his poems have been published by Haupt, Korn, R. Ellis, Paley, Simmons, Palmer, and (in America) Miller and Bain. A good translation of his *Metamorphoses* is that edited by Garth, with the assistance of Dryden, Addison, Congreve, and others; while special passages of the same poem have been admirably rendered by Pope, Henry King, and D'Arcy Thompson. The *Fasti* have been translated by Gower (1640) and Massey (1757). There is a prose translation of the complete works by Riley (Bohn's Library).

OVIDUCT, n. *ō'vi-dŭkt* [L. *ovum*, an egg; *ductus*, led, conducted]: the passage from the ovary to the uterus; the Fallopian tube.

OVIE'DO: province of Spain. See ASTURIAS.

OVIEDO, *o-ve-ā'thō:* pleasant and healthful city of Spain, cap. of the modern province of O. (anc. Asturias, (q.v.); on a plain between the rivers Nalon and Nora, 61 m. n.n.w. of Leon, 22 m. s.s.w. of Gijon, on the Bay of Biscay. In the centre of the city is a handsome square, from which four principal streets, terminating in alamedas or promenades, branch off toward the n., s., e., and w., respectively. These main streets are connected by others, and all are clean and well paved. Pure water is abundantly supplied by a long aqueduct, and is delivered in the city by 11 public fountains. The cathedral, a beautiful cruciform specimen of Gothic, richly ornamented, contains (in the Chapel of the Virgin) the remains of many of the early kings and princes of Asturias, and has a fine old library. Some curious but eminently questionable relics are in the church of *San Miguel*, the second oldest Christian building after the Moorish invasion. In the immediate vicinity of the city are other churches in the early Saxon style, which are among the oldest in the peninsula. The convent of San Vincente, founded 1281, has been secularized, and is now occupied by govt. offices, etc. Linens, woolens, hats, and firearms are made here. Pop. (1900) 48,103.

Oviedo was known during the middle ages as *Civitas Episcoporum*, because many of the Spanish prelates who had been dispossessed of their sees by the Moors took refuge here. This city, the see of a bishop, was twice plundered of its ecclesiastical and other treasures during the war of independence; first by Soult, afterward by Bonnet.

OVIEDO Y VALDES, *o-ve-ā′thō e vâl-dĕs′*, Gonzalo Fernandez de: Spanish chronicler: 1478–1557; b. Madrid. He was sent by Ferdinand to San Domingo, W. Indies, 1514, as intendant and inspector-gen. of the trade of the new world. During his long residence there, he spent his leisnre in acquiring a knowledge of the W. Indies; and, after his return to Spain, published at Toledo, 1526, *Summario de la Historia General y Natural de las Indias Occidentales*, dedicated to Charles V. He afterward made additions to the work, which was republished at Seville 1535, 21 vols., nnder the title *La Historia General y Natural de las Indias Occidentales.* He left other 29 books in MS. A complete ed. was published at Madrid (1851–55). O. died at Valladolid. Besides his *History of the W. Indies*, he wrote *Las Quinquagenas*, a valuable, gossiping, and anecdotical account of all the principal personages of Spain in his time, still in MS. in the royal library at Madrid; and chronicles of Ferdinand, Isabella, and Charles V. A life of Cardinal Ximenes is also attributed to him.

OVIFEROUS, a. *ō-vĭf′ėr-ŭs* [L. *ovum*, an egg; *fero*, I bear]: egg-carrying, applied to such animals as spiders, that carry about with them their eggs after exclusion; or Ovigerous, a. *ō-vĭj′ėr-ŭs* [L. *gero*, I bear], with the same sense.

OVIFORM, a. *ō′vĭ-fawrm* [L. *ovum*, an egg; *forma*, shape]: egg-shaped.

OVILE, a. *ŏ′vīl*, or Ovine, a. *ō′vīn* [L. *ovis*, a sheep]: pertaining to or consisting of sheep.

OVIPAROUS, a. *ō-vĭp′ă-rŭs* [L. *ovum*, an egg; *parĭō*, I produce]: producing young by eggs hatched after exclusion from the body of the parent. Except the mammalia, all animals are either Oviparous or Ovoviviparous (q.v.); the latter mode—not essentially different from the former—being comparatively rare. Even those invertebrate animals which multiply by gemmation and division have also a true reproduction by *ova.* See Egg and Reproduction. Ovip′ara, n. plu. *-ă-ră*, animals which bring forth their young as eggs.

OVIPOSIT, v. *ō′vĭ-pŏz′ĭt* [L. *ovum*, an egg; *posĭtus*, placed]: to lay eggs. O′vipos′iting, imp. O′vipos′ited, pp. O′vipos′iting, n., or O′viposi′tion, n. *-pō-zĭsh′ŭn*, the laying or depositing of eggs. O′vipos′itor, n. *-pŏz′ĭ-tėr*, the instrument or organ, terminating the abdomen, by which an insect deposits its eggs.

OVISAC, n. *ō′vĭ-săk* [L. *ovum*, an egg; *saccus*, a bag]: the egg-bag or membrane which connects in one mass the eggs, spawn, or roe of crustaceans and many insects; the cavity in the ovary containing the ovum.

OVOID, a. *ō′voyd*, or Ovoidal, a. *ō-voyd′ăl* [L. *ovum*, an egg; Gr. *eidos*, form or shape]: having a shape resembling an egg. O′void, n. a solid with an ovate figure.

OVOLO, n. *ō′vŏ-lō* [It. *ovolo*, a wave, an ogee—from L. *ovum*, an egg]: in *arch.*, a round or convex molding in the form of an egg. See MOLDINGS. In Roman architecture, the O. is an exact quarter of a circle; in Greek architecture, the curve is sharper at the top, and quirked. It is used sometimes in *Decorated* Gothic.

OVOLOGY, n. *ō-vŏl′ŏ-jĭ* [L. *ovum*, an egg; Gr. *logos*, discourse]: the branch of natural science which treats of the origin and functions of eggs; a description of the ovum.

OVOVIVIPAROUS, a. *ō′vō-vĭ-vĭp′ă-rŭs* [L. *ovum*, an egg; *vivus*, alive; *parĭō*, I produce]: term applied to animals of which the egg is hatched within the body of the mother, so that the young is excluded alive, though the fetus has been inclosed in an egg almost to the time of parturition: it is probable that the egg is often broken in parturition itself. Some fishes are ovoviviparous, and some reptiles; also the *Monotremata*. The common lizard and the viviparous lizard, both natives of Britain, are illustrations of the near resemblance which may subsist between Oviparous (q.v.) and ovoviviparous animals. The distinction is much less important than might be supposed.

OVULE, n. *ō′vūl*, or O′VULUM, n. *-vū-lŭm* [dim. of L. *ovum*, an egg: F. *ovule*]: in *bot.*, the germ borne by the placenta of a plant, which gradually changes into a seed; the seed contained in the ovary. The Germen (q.v.) or ovary sometimes contains only one O., sometimes a small *definite* number, sometimes a large *indefinite* number. Ovules are to be regarded as metamorphosed buds. 'The single ovule contained in the ovaries of compositæ and grasses may be called a terminal bud, surrounded by a whorl of adhering leaves or carpels, in the axil of one of which it is produced.'—Balfour, *Manual of Botany*. The O. is not always contained in an ovary. In Gymnogens (q.v.), the ovary is wanting, and the O. is *naked;* but the plants possessing this character are comparatively few. The O. is attached to the *Placenta* (q.v.), and by it to the Carpel (q.v.), from which it is developed. The attachment to the placenta is either immediate, when the O. is said to be *sessile;* or by an umbilical cord (*funiculus*), which sometimes elongates very much after fecundation. The O. is, in general, essentially formed of a cellular *nucleus* inclosed by two membranes, the outer of which is called the *primine*, and the inner the *secundine*. At one end of the nucleus there is an opening of both membranes—the *foramen*—through which the access of the pollen in Fecundation (q.v.) takes place. The *Chalaza* (q.v.) unites the nucleus and these membranes at the base. When the O. is so developed that the chalaza is at the base, and the foramen at the apex, it is said to be *orthotropal* [Gr. *orthos*, straight; *tropos*, a mode]. When the O. is bent, so that the foramen is brought near the base, it is called *campylotropal* [Gr. *kampylos*, curved]. When, by increasing on one side

more rapidly than on the other, the O. has its foramen close to the base, the chalaza being carried round to the opposite extremity, the O. is *anatropal* [Gr. *anatrepo*, to turn upside-down]. Anatropal ovules are very common. When the O. is attached to the placenta so that the foramen and chalaza are at opposite ends, the base being in the middle, it is called *amphitropal* [Gr. *amphi*, around].—When the O. arises from the base of the germen, it is said to be *erect;* when it hangs from the apex of the cavity of the germen, it is *pendulous;* when it arises from the side of the germen above the base, it is *ascending;* when it hangs from the side of the germen below the apex, it is *suspended.* When two or more ovules are found, not only in the same ovary, but in the same cell, they usually have different modes of attachment. See CHALAZA: EMBRYO: FECUNDATION: GERMEN: PLACENTA: SEED.

OVULITES, n. plu. *ō′vū-līts* [L. *ovum*, an egg; Gr. *lithos*, a stone]: in *geol.*, a general name for all fossil eggs, whether of birds or reptiles.

OVUM, n. *ō′vŭm*, OVA, n. plu. *ō′vă* [L. *ovum;* F. *ove*, an egg: Gr. *ōŏn*, an egg]: an egg; in *arch.*, an egg-shaped ornament. OVULATION, n. *ō′vū-lā′shŭn*, the formation, development, and discharge of the eggs.

OWASCO, *ō-wâs′kō*, LAKE: beautiful sheet of water in Cayuga co., N. Y., 3 m. from Auburn; about 11 m. long, and 1 to 1½ m. wide; 758 ft. above sea-level. Through Owasco creek, the water flows through Auburn into the Seneca river. It is in the midst of charming scenery, is surrounded by a productive region, and is a popular summer resort.

OWE, v. *ō* [Goth. *aigan*, to possess; *aihts*, possessions; Icel. *eiga;* AS. *agan*, to possess: Ger. *eigen;* AS. *agen;* Scot. *awin*, what is possessed by any one, own]: to be indebted to; to be obliged or bound to pay. OWING, imp. *ō′ĭng*, due, as a debt; imputable to; ascribable, as to a cause; consequential. OWED, pp. *ōd.* See also OWN 1. *Note.*—'*To own a thing* is to claim it as possessed by one's self: *to owe money* is an elliptical expression for having it to pay to another, or possessing it for another. A Yorkshireman says, "Who *owes* this?" meaning, "Who is the possessor of this? To whom does this belong?" '—Wedgwood.

OWEGO, *ō-wē′gō:* village, cap. of Tioga co., N. Y.; on the New York Lake Erie and Western, the Delaware Lackawanna and Western, and the Lehigh Valley railroads, and at the confluence of the Owego creek with the Susquehanna river; 22 m. w. of Binghamton, 237 m. w. of New York, 37 m. e. of Elmira. It has 8 churches, an academy and excellent public schools, a public library, a fine court-house, 1 daily and 3 weekly newspapers, and three national banks (cap. $250,000). There are foundries, machine-shops, flour-mills, planing-mills, a piano factory, carriage-works, and various manufactures. The village is in a fine farming district,

with which it has considerable trade ; the streets are wide, and pleasantly shaded with maple-trees ; and the place is growing in favor as a summer resort. The first white settlement was made 1785, and the village was incorporated 1827. Pop. (1870) 4,756 ; (1880) 5,525 ; (1890) town 9,008 ; (1900) 5,039; (1910) 4,633.

OWEN, *ō′wĕn*, JOHN, D.D.: eminent Puritan and Congregational divine: 1616–1683, Aug. 26; b. Stadham, Oxfordshire, England; son of the Rev. Henry O., vicar of Stadham; of an ancient Welsh family. In his 12th year he was entered of Queen's College, Oxford, where he worked with amazing diligence, for years taking no more than four hours' sleep a night. In 1635 he 'commenced' M.A. At this period (if his own statement does not exaggerate), his great ambition was to acquire celebrity either in church or state; and he confesses the irreligiousness and worldliness of his motives with entire frankness. Yet he appears to have been agitated even during his student life by the *quæstiones vexatæ* of ecclesiastical politics, and made himself so conspicuous by his anti-Laudianism that he was forced to leave Oxford. His parents were Puritans who had remained in the Chh. of England; and gradually his own Puritanism became so decided that most of his student friends abandoned his society. The next five or six years of his life were spent generally in a state of anxious and melancholy introspection. When the civil war finally broke out, O. was living as chaplain with Lord Lovelace of Hurley, in Berkshire. His lordship was a royalist, and went to join the king's army, whither O., who had warmly espoused the cause of the parliament, could not accompany him. About the same time, his uncle, a gentleman of property in Wales, who, having no children of his own, meant to have made O. his heir, indignant at the zealous Puritanism of his nephew, settled his estate upon another, and died without leaving him a farthing. The almost friendless scholar now removed to London, where a casual sermon, preached by a stranger in Calamy's church, had the effect of imparting to his soul the peace of Christian faith. In 1642 he published his *Display of Arminianism*, a work very acceptable to the Puritan party, and drawing to him the favorable regards of the house of commons. Soon afterward, the 'Committee for Purging the Church of Scandalous Ministers' presented him with the living of Fordham, in Essex. His ministrations were exceedingly popular, people coming from great distances to hear him preach. About 1646 he removed to Coggeshall, where his views of church government underwent a modification. Till this time, though he had favored a church polity consisting less in government and more in fellowship, he had been counted a Presbyterian; but he now became a moderate Independent, i.e., a Congregationalist. The Presb. clergy—intolerant and dogmatical—fell upon him at once for his 'apostasy,' but failed to perturb his sober temper. At Coggeshall he wrote his *Salus Electorum*,

Sanguis Jesu ('The Blood of Jesus, the Salvation of the Elect'), the result of seven years' study, and of which he himself said that 'he did not believe that he should live to see a solid answer given to it.' His fame still increasing, he was sent for 1646 to preach before the parliament. To his discourse, entitled *A Vision of Free Mercy*, he added an appendix, in which he pleads for liberty of conscience in matters of religion, which was entirely in accord with Cromwell's principles, but not with the then prevalent Presb. view. In 1647 he preached to the army under Fairfax besieging Colchester, uttering earnest dissuasion from religious persecution. He was again chosen to preach before the house of commons the day after the execution of King Charles I. (1649, Jan. 31), but discreetly avoided a vindication of the act. About this time, Cromwell made his acquaintance, and thought so highly both of his preaching and of his character that he insisted on O. accompanying him to Ireland, where the latter remained about half a year. In 1650 he went with Cromwell to Scotland, and resided in Edinburgh several months; 1651, the house of commons appointed him dean of Christ-Church, Oxford; and 1652, when only in his 36th year, Cromwell, as chancellor, made O. vice-chancellor of the university. He discharged his duties with utmost impartiality. Though himself a Congregationalist, and owing his honors directly to the Independent party, O. never showed himself a partizan. Most of the vacant livings in his patronage were bestowed on Presbyterians; and Episcopalians were allowed to celebrate Divine worship in their own way, nor could the vice-chancellor ever be induced to offer them the slightest molestation. While at Oxford, the 'Atlas of Independency,' as Wood grandiloquently dubs O., wrote his *Diatriba de Divina Justitia*, his *Doctrine of the Saints' Perseverance*, his *Vindiciæ Evangelicæ*—against Biddle (q.v.) and the Socinians—and his *Mortification of Sin in Believers*. He was one of the well-known 'tryers' appointed to 'purge' the church of 'scandalous' (i.e., royalist) 'ministers,' and in this capacity signalized himself by his friendly offices on behalf of men of learning and merit, among whom may be mentioned the celebrated Dr. Edward Pocock, prof. of Arabic. O. was not a subservient adherent of Cromwell, but publicly objected to the proposal that he should be proclaimed king. In 1657 he was succeeded as vice-chancellor of the univ. by Dr. Conant. The year after Cromwell's death, the Presb. party again became strong, and O. was immediately ejected from his deanery of Christ-Church, whence he retired to Stadham, in Oxfordshire, where he had purchased an estate, and where he formed a congregation, to which he ministered until his removal to London, shortly after the Restoration. The writings belonging to this period of comparative retirement are: *Communion with God; On the Divine Original, Authority, Self-Evidencing Light, and Power of the Scriptures; Theologoumena*, or *De Natura, Ortu*,

Progressu, et Studio. Veræ Theologiæ; and an uncritical and unscholarly diatribe against Walton's *Polyglott*. In 1662 he published *Animadversions to Fiat Lux*, treatise by a Franciscan friar in the interest of Rom. Catholicism. It was followed by works on *Indwelling Sin*, on the cxxxth Psalm, and on 'The Epistle to the Hebrews,' the last of which began to appear 1668, and is usually reckoned O.'s *magnum opus*. In 1669 he published *Truth and Innocence Vindicated*, a reply to Samuel (afterward Bp.) Parker's *Discourse on Ecclesiastical Policy;* and 1673 became pastor of a large congregation in Leadenhall street. His last publications of importance were: *Discourse Concerning the Holy Spirit* (1674); *Doctrine of Justification by Faith* (1677), a treatise still much admired by many; and *Christologia, or Glorious Mystery of the Person of Christ.*

O. in his later years was held in the highest esteem by many of the most influential personages in the land, such as the Earl of Orrery, the Earl of Anglesea, Lord Willoughby, Lord Berkeley, Sir John Trevor. When he was at Tunbridge for the use of the waters, even the Duke of York and Charles II. showed him particular attention, and had long conversations with him on the subject of Nonconformity. O. died at Ealing, and was buried in Bunhill Fields. His funeral was attended by no less than 60 noblemen.—O. was the most voluminous, but not the most powerful, writer among the Puritan divines. His writing tends largely to prolix and passionless disquisitions; his arguments are tedious; his style is ponderous; he lacks spiritual perception; and one can almost pardon the irreverent criticism of Robert Hall, who is said to have pronounced them a 'continent of mud.' Yet O. had great learning; and in that age of almost universal partizanship his Christian moderation and sincerity were worthy of highest praise. The best ed. of his works was pub. Edinburgh (1856, *et seq.*).

O'WEN, John Jason, d.d., ll.d.: 1803, Aug. 13—1869, Apr. 18; b. Colebrook, Conn. He graduated from Middlebury College 1829, from Andover Theol. Seminary 1831, and became a Presb. minister 1832. Though he preached for some time, he was never settled as a pastor. He was at the head of Cornelius Institute, New York, 1836–48, prof. of Latin and Greek in the New York Free Acad. 1849–53; in the latter year he was made vice-pres. of the institution (known since 1866 as the College of the City of New York), and held the position till his death. He was widely known as a classical scholar, and his translations of the *Anabasis*, *Odyssey*, etc., were in wide use in schools. Among his publications were *Acts of the Apostles, in Greek, with a Lexicon* (1850), and a *Commentary on the Gospels* (3 vols. 1857, republished 1873). He died in New York.

OWEN.

O'WEN, Sir Richard: one of the most distinguished of anatomists and paleontologists: b. Lancaster, Eng. 1804, July 20–1892, Dec. 13. From the gram. school of that town, he passed at the age of 20 to Edinburgh University, where his natural talents early developed themselves. He was an active student, and, with others of kindred spirit, formed the Hunterian Soc., of which he was chosen pres. 1825. In 1826 he removed to London, joining the medical school of St. Bartholomew's Hospital; and to the Medical Soc. of that institution he communicated his earliest published paper: 'An Account of the Dissection of the Parts Concerned in the Aneurism, for the Cure of Which Dr. Stevens Tied the Internal Iliac Artery,' which appeared in *Medico-Chirurgical Transactions* 1830. It was doubted whether so deep-seated an artery could have been reached; but he showed that the ligature had been applied to the internal iliac, and the aneurism had in this way been obliterated.

It had been his intention to enter the navy; but when he finished his education, he accepted an appointment as assistant to Mr. Clift, curator of the museum of the Royal College of Surgeons, and helped him in the preparation of his catalogues of 'Pathological Specimens' (1830), 'Monsters and Malformations' (1831), but chiefly of the 'Specimens of Natural History in Spirits' (1830). He had, about this time, the fortune to obtain a specimen of *Nautilus pompilius*, an animal almost unknown, and of great importance not only in itself, but chiefly because of its numerous fossil allies. The results of his careful dissection of this specimen were published in an elaborate memoir, which at once gave him high position among naturalists, for its advanced views on structure and affinities. The continued examination of Hunter's extensive collections in the College of Surgeons' museum was his great work, resulting in the enlargement and arrangement of the collections, and in the publication of his *Descriptive and Illustrated Catalogue of the Physiological Series of Comparative Anatomy*, issued in sections 1833–40; of his *Palæontological Catalogue*, of which the Mammals and Birds were pub. 1845, and the Reptiles and Fishes 1854; and of his *Catalogue of Recent Osteology* (1854), in which he describes 5,906 specimens. The collections, which in 1828 were contained in one small, badly lighted room, in 1856, when O.'s connection with them terminated, filled ten times the original space—three large galleries having been specially erected to contain them. O.'s position as curator of the Hunterian Museum, to which he succeeded on the death of Clift, awakened in him a special interest in its famous founder. In 1837 he published a new ed. of Hunter's *Animal Economy*, adding to it all the known published papers of its author; and giving in the preface, for the first time, a descriptive narrative of Hunter's real discoveries. He afterward edited two vols. of *Essays and Observations on Nat. History, Anatomy, etc., by John Hunter* (1861), which had been saved from Home's unprincipled and

barbarous destruction of Hunter's manuscripts, by having been transcribed by Clift, who was the last articled apprentice of Hunter. In the preface to these vols., O. showed Hunter's advanced views in geology and paleontology.

The first appointment of O. as public lecturer was to the chair of comparative anatomy in St. Bartholomew's Hospital 1834. Two years afterward, he succeeded Sir Charles Bell as prof. of anatomy and physiology in the College of Surgeons, and was in the same year appointed by the college first 'Hunterian professor.' For 20 years he continued to illustrate the recent and fossil treasures of the museum, until, 1856, he was appointed supt. of the nat. hist. depts. of the British Museum. This post he resigned on account of age 1883.

We have not space to record even the principal of O.'s numerous published papers. His earliest communications to the Royal Soc. were papers on the generation of the ornithorhynchus and of the kangaroo. In numerous memoirs 1835–62, he expounded the structure and affinities of the higher quadrumana; and in these and other papers, he proposed the use of the brain-structure, as an important element in classification. It has been objected that the particular parts to which he referred, in characterizing his highest class, are found in the lower classes; but the objectors forget that he does not use the existence of the parts as his characters, but only their remarkable development. A similar objection may be urged against every possible system of classification, for no decided line can be drawn around any group, the whole animal world being united by a graduation of structure. His exposition of the recent and fossil birds of New Zealand is well known. He published first two elaborate papers on the anatomy of the Apteryx, and then at intervals seven or eight monographs on the gigantic struthious Birds which formerly existed in those distant islands. His descriptions and restorations of extinct animals are perhaps the most important of all his labors. He has published a monograph on the British Fossil Mammalia and Birds, and six parts of an elaborate systematic history of British Fossil Reptiles. In describing the fragmentary fossil relics brought home by Darwin from S. America, he established many remarkable forms from very scanty materials, and showed that there existed in America, during the tertiary period, a mammalian fauna, the individuals of which were, for the most part, of gigantic size, yet similar in type to existing animals of that continent. Subsequently, he clearly expounded the various genera of huge sloths from the same region, whose remains were previously confounded or misunderstood. A series of fossils from Australia revealed to him a remarkable group of gigantic marsupials, resembling in type the present tenants of that island-continent. He was the first to expound the structure and affinities

of the singular long-tailed bird from Solenhofen. See his well-known *Palæontology* (1861). Among his more recent works in this field are: *The Fossil Reptilia of S. Africa* (1876); *On the Fossil Mammals of Australia and on the Extinct Marsupials of England* (1877); and *On the Extinct Wingless Birds of New Zealand* (1879).— His great work on the microscopic structure of the teeth, the *Odontography*, published 1840–45, contains descriptions and exquisite drawings of the minute structure of a very extensive series of the teeth of every class of animals, and forms an immense storehouse of information alike to the anatomist and to the geologist. He has published original papers on every branch of the animal kingdom, living and fossil; and it has been said justly of him that, 'from the sponge to man, he has thrown light over every subject he has touched.' Some idea of the magnitude of his labors may be formed from the fact that his published productions amount to more than 360 different papers and works, many being most voluminous and laborious.

O. married, 1835, the only daughter of Clift, his colleague at the College of Surgeons. In 1858 he resumed his position as Fullerian prof. of physiology in the Royal Institution of Britain, which, about twenty years before, he had filled for two sessions; and in the following year he was appointed Reade lecturer by the Univ. of Cambridge; but has now resigned these offices. He is a fellow and active member of most of the metropolitan scientific societies, one of the eight foreign associates of the Institute of France, and an honorary member of many foreign societies. From France he received the order of the Legion of Honor; from Prussia, the Ordre pour le Mérite; from Italy, the order of St. Maurice and St. Lazare. He was made a companion of the Bath 1873, and a K.C.B. 1883.

O'WEN, Robert: social theorist and schemer: 1771, May—1858, Nov. 17; b. Newton, Montgomeryshire, Wales. He does not appear to have had more than a merely commercial education to fit him for common business. The point from which his peculiar career may be said to have started was his marriage, 1799, to the daughter of David Dale, owner of the celebrated cotton-mills at New Lanark, on the Clyde. This establishment was very successful as a money speculation, and it is noticeable that Jeremy Bentham made a small fortune by investing in it. Dale was known to be a thorough man of business; but whether O., by his peculiar faculties for organization, contributed to the prosperity of the establishment in its early stages, is doubtful. It is certain that, as his larger schemes developed themselves, he was felt to be a dangerous partner in a good business, and he was gradually elbowed out of any share in the management, and he finally (1828) disposed of his interest in the property.

It should be remembered, however, of a man whose life will go down to posterity as one long absurdity,

that in his connection with New Lanark Mills he did practical good on a scale not small. He was naturally active and interfering, and, being a humane man, it struck him that much degradation, vice, and suffering arose from the disorganized manner in which the progress of machinery and manufactures was huddling the manufacturing population together. He introduced into the New Lanark community education, sanitary reform, and various civilizing agencies, which philanthropists at the present day are but imperfectly accomplishing in the great manufacturing districts. A factory was, however, far too limited a sphere for his ambition. He wanted to organize the world; and that there might be no want of an excuse for his intervention, he set about proving that it was in all its institutions—the prevailing religion included—in as wretched a condition as any dirty, demoralized manufacturing village. Such was the scheme with which he came out on the astonished world 1816, in *New Views of Society, or Essays on the Formation of the Human Character;* and he continued, in books, pamphlets, lectures, and other available forms, to keep up the stream of agitation for reorganization of society, on the principle of socialism, till his death. His plans for relief of pauperism found at first much public favor: leading journals and many eminent men gave him countenance. But his defiant attack on all forms of received religion, at a great meeting in London, wrought an instant change. His socialism was identified with infidelity, and all his efforts thereafter were discredited in the popular mind. He had at least three grand opportunities of setting up limited communities on his own principles—one at New Harmony, Ind., United States (1825); a second at Orbiston, Lanarkshire, Scotland; the third at Harmony Hall, Hampshire, England (1844). They all were, of course, failures, as were several subsequent attempts in the same direction; and O. attributed their failure to their not being perfected on his principles. His life was a remarkable phenomenon, from the preternatural sanguineness of temperament which, in the face of failures, and a world ever growing more hostile, made him believe to the last that all his projects were on the eve of success. In the revolution of 1848, he went to Paris, with hopes on the highest stretch; but his voice was not loud enough to be heard in that vast turmoil. He appeared at the meeting of the Social Science Assoc. at Liverpool in the autumn of 1858, with all his schemes as fresh as ever. He died a few weeks afterward. A life of O. by A. J. Booth appeared 1869 (Trübner).

O'WEN, Robert Dale: 1800, Nov. 9—1877, June 17; b. Glasgow, Scotland; son of Robert O. (q.v.). He came to the United States 1825, and was associated with his father in the effort to found New Harmony. In 1828 he established in New York a weekly journal, the *Free Inquirer*, to promulgate his socialistic ideas. He returned to Indiana 1835, and was elected to the legislature;

served in congress 1843-47, and, among other notable acts, introduced the joint resolution relative to the occupation of Oregon, as also the bill for the organization of the Smithsonian Institution: he served later as one of the regents of the institution. In the constitutional convention of Indiana 1850, he was chairman of the committee on rights and privileges; 1851, being a member of the legislature, he carried a bill for enlarging the rights of widows and married women. 1853-58, he was first *chargé d'affaires*, then minister at Naples, and negotiated two important treaties. During the civil war, he was an ardent Unionist. His published writings are: *Education at New Lanark; Moral Physiology; Popular Tracts; Personality of God and Authority of the Bible; Pocahontas: a Drama; Public Architecture; Construction of Plank-Roads; Footprints on the Boundary of Another World; Beyond the Breakers; Debatable Land between This World and the Next;* finally, *Threading My Way,* an autobiography.

O'WEN, WILLIAM: English painter: 1769-1825; b. Shropshire. He studied painting under Catton and under Sir Joshua Reynolds. From the date of exhibition of his first portrait, 1792, he took good rank among portrait-painters, and had among his sitters many men eminent in politics and literature.

OWENIA, *ō-ē'nĭ-â* [named from Richard *Owen,* naturalist]: genus of trees, of order *Meliaceæ,* tribe *Trichilicæ.* Of the five species, all Australian, some have hard wood, excellent for cabinet-making: one of these, *O. venosa,* is called tulip-wood.

O'WEN MER'EDITH (pseudonym): see LYTTON (EDWARD ROBERT LYTTON BULWER-LYTTON), Earl.

OWENSBOROUGH, *ō'ĕnz-bŭr-ŭh:* city, cap. of Daviess co., Ky.; on the Ohio river and the Illinois Central, Louisville and Nashville, and Louisville, H. & S. L. and other railroads. It is 160 m. below Louisville and 41 m. s. of Evansville, Ind. The industries of O., operated in over 50 factories, include whiskey distilling, the making of brandy, flour, tobacco products, machinery, electrical supplies, celluloid, wagons, carriages, brick and tiling. The tobacco interests in O. and vicinity are extensive and valuable. Coal and iron are mined in considerable quantities. Productive oil-fields are near-by. There is an important river trade, steamers plying between O. and all other river ports. The city is located in a rich farming and successful stock-raising district. Good-yielding deposits of iron, lead, zinc and fire-clay, also stone quarries, are in the vicinity of O. The city contains many churches and schools, a theatre, several banks and newspapers. O. is the seat of St. Francis Academy and the O. Female College. The water-works and electrical supply of public lighting are under city control and operation. There is a U. S. government building at O., now recognized as a leading Southern

city of remarkable development with a future of great promise. It is admirably situated for purposes of extended commercial operations and the municipal administration gives constant evidence of a progressive spirit. A railroad (mineral and timber line) leads to rich mines of coal and a fine lumber section. O. was settled 1815, and obtained a city charter 1850. Pop. (1900) 13,189; (1910) 16,011.

O'WENS COL'LEGE, Manchester: founded 1851, under the will of John Owens, a Manchester merchant, who, vexed with the tests in the universities, left £96,654 for instruction of young men 'in such branches of science and learning as were then and might be thereafter usually taught in English universities.' It was successful from the beginning; and the college has now a staff of about 50 professors and lecturers—some among the foremost men in their respective subjects—in the two depts. of arts, science, and law, and of medicine. There are between 20 and 30 scholarships and prizes, and a valuable fellowship. The handsome new college buildings, erected since 1870, cost £120,000. The Beyer bequest (1876) added £107,000; the Sir Benjamin Whitworth bequest (1888) more than £100,000. The total of gifts (funds and buildings) may be stated approximately at about £500,000 ($2,500,000): total students over 800, including 400 art students, 60 women, 380 medical students.

In 1880 a charter was granted to a new VICTORIA UNIVERSITY, of which O. C. was constituted a college. Other colleges (e.g., Yorkshire College at Leeds) may be admitted on certain conditions. The univ., which will be ultimately a federation of colleges, has its seat in Manchester; and, unlike London Univ., is at once a teaching and examining body, exacting from intending graduates attendance on a defined course of study. Every college admitted to the federation must have a sufficient teaching staff and curriculum, must be established on a sound basis, and must be under control of its own governing body. The univ. court has power to exclude any college that has ceased to be efficient.

O'WEN SOUND: town, cap. of Grey co., Ontario, Canada; on the Canadian Pacific railroad, and on Owen Sound and Georgian Bay; 45 m. from Collingwood, 122 m. n.w. of Toronto. It is a port of entry, has an excellent harbor, which admits the largest vessels, and has extensive lumber and grain trade. There are 1 monthly and 2 weekly papers and 5 banks. There are excellent water power and numerous manufactures, including agricultural implements, wooden ware, sewing-machines, and woolen goods of various kinds. There is also some ship-building. Pop. (1901) 8,776.

OWL, n. *owl* [AS. *ule;* Icel. *ugla;* Ger. *eule;* Dut. *uil*, an owl: comp. L. *ul'ŭlă;* Skr. *ulúka*, an owl—from the cry of the bird]: well-known rapacious bird which flies during the night, and hoots or howls: the name is a general designation for every nocturnal bird of prey. OWLISH, a. *owl'ĭsh*, or OWL-LIKE, a. *-līk*, resembling an owl. OWLET, also spelled HOWLET, n. *owl'ĕt*, an owl; young owl.—The *Owl*, comprising nearly 200 recognized species, forms a numerous and well-defined group of birds, constituting the family *Strigidæ*. It is to be noted, however, that ornithologists differ greatly in their classification, and that the nomenclature is confused. The owls are easily distinguished by the large size of their heads, and by their great eyes, directed forward, and surrounded with more or less perfect disks of feathers radiating outward; while the small hooked bill is half-concealed by the feathers of these disks, and by bristly feathers which grow at its base. The bill is curved almost from its base; the upper mandible not notched, but much hooked at the tip. The claws are sharp and curved, but, like the bill, less powerful than in the *Falconidæ*. The outer toe is generally reversible at pleasure, so that the toes can be opposed two and two, to give greater security of grasp. The wings, though usually long, are less adapted for rapid and sustained flight than those of the diurnal birds of prey, and the bony framework by which they are supported, and the muscles which move them, are less powerful; the owls in general taking their prey, not by pursuit, but by surprise, to which there is a beautiful adaptation in the softness of their plumage, and their consequently noiseless flight—the feathers even of the wings being downy, and not offering a firm resisting surface to the air, as in falcons. The soft and loose plumage adds much to the apparent size of the body and of the head; but the head owes its really large size to large cavities in the skull, between its outer and inner *tables* or bony layers, which cavities communicate with the ear, and are supposed to add to the acuteness of the sense of hearing. This sense is certainly very acute, and the ear is, in many species, very large. It is furnished with an external conch, found in no other birds. It is, however, concealed by the feathers, being on the outside of the disk which surrounds the eye; but the feathers immediately surrounding the ear are arranged in a kind of cone, serving a purpose like that of an ear-trumpet. In some species, the ear is furnished with a remarkable lid or operculum, which the bird has the power of opening and shutting at pleasure. The disk which surrounds the eye serves to collect rays of light and throw them on the pupil; and owls can see well in twilight or moonlight, but are generally incapable of sustaining the glare of day, many of them becoming bewildered when exposed to it, and evidently suffering pain, which they instinctively seek to relieve by frequent motion of the third eyelid or nictitating membrane of the eye. The

legs and feet of owls are feathered to the toes, and in many species even to the claws.

The digestive organs much resemble those of the Falconidæ, but there is no crop, and the stomach is more muscular. The gullet is very wide throughout, and owls swallow their prey either entire or in very large morsels. The largest species feed on hares, fawns, the largest gallinaceous birds, etc.; others on small mammalia, reptiles, birds, and sometimes fishes; some feed partly or chiefly on large insects.

Some of the owls have the disks of the face imperfect above the eyes, the whole aspect somewhat approaching that of falcons; the conches of the ears small, and the habits less nocturnal than the rest of this family. These constitute one of the three generally received divisions in which the species are arranged. Another division, with more perfect disks around the eyes, is characterized by the presence of two feathery tufts on the head, popularly called horns or ears, and sometimes egrets or aigrettes. The third division is destitute of these tufts, the disks of the face are perfect, and the ears are very large. On these distinctions, and on the

1. Great or Eagle Owl (*Bubo maximus*); 2. Snowy Owl (*Nyctea nivea*); 3. Virginian Eared Owl (*Bubo Virginianus*); 4. White or Barn Owl (*Strix flammea*); 5. Long-eared Owl (*Otus vulgaris*); 6. Foot of Snowy Owl.

feathered or unfeathered toes, and other points not of great importance, are founded the genera into which the Linnæan genus *Strix* has been broken by recent ornithologists. See, e.g., the characters of *Bubo* in the article EAGLE OWL.

Owls are found in all parts of the world, and in all climates. Some species have very wide geographical range. The WHITE OWL, or BARN OWL, or SCREECH OWL (*Strix flammea*), is one of those having perfect disks

around the eyes, and no aigrettes. It is about 14 inches in whole length. The tail is, as in most of the owls, rather short and rounded; the wings reach rather beyond the tail. The toes are not feathered. The head and upper parts are of pale orange color, marked by a multitude of small, scattered, chestnut-colored spots, and gray and brown zigzag lines; the face and throat white. This owl frequents old buildings and outhouses, destroys great numbers of rats and mice, and deserves the protection of the farmer. The voracity of owls is wonderful, and they kill, if possible, more than they need, storing for future use. The barn owl is easily tamed if taken young. When irritated, it has, like some other—perhaps all—owls, a habit of hissing and snapping its mandibles together. It seldom leaves its retreat by day, unless driven out; and when this is the case, all the little birds of the neighborhood congregate about it as an enemy which may then be safely annoyed, and the grimaces of the poor owl, blinded by the too strong light, are very grotesque. This species has been said to be an inhabitant of almost all parts of the world, but there is reason to think that similar species have been confounded.—The Tawny Owl, Brown Owl, or Ivy Owl (*Strix*, or *Syrnium*, *stridula* or *aluco*), is a species about the size of the barn owl, or rather larger, with rather longer tail and comparatively short wings, the feet feathered to the claws; the upper parts mostly ash-gray mottled with brown, the under parts grayish white and mottled.—The Long-eared Owl (*Strix otus*, or *Otus vulgaris*) and the Short-eared Owl (*S.* or *O. brachyotos*), species with aigrettes, are frequent British and American birds.—Of the species with imperfect disks around the eyes, and more falcon-like aspect, one of the most interesting is the Snowy Owl (*Strix*, or *Surnia*, *nyctea*), the *Harfang* of the Swedes, a species seen, though rarely, in southern regions in winter, but well known in all far northern parts of the world. It is 22 to 27 inches in length, feeds on every kind of animal food which it can obtain, and has white plumage spotted and barred with brown, the legs densely feathered to the claws.—A very remarkable N. Amer. species is the Burrowing Owl (*Strix*, or *Athene*, *cunicularia*), which, when necessary, excavates a burrow for itself, but prefers to take possession of those of the marmot, called the Prairie Dog (q.v.), with which it is a joint tenant. It is not the only species of owl which inhabits holes in the ground.—The Boobook, or Bookbook, of Australia (*Strix*, or *Noctua*, *Boobook*) is a species of owl which frequently repeats during the night the cry represented by its name, as if it were a nocturnal cuckoo. Some of the species of owl are small birds; among the rarer species are one of $8\frac{1}{2}$ inches, and one scarcely more than 7 inches long. Some owls are at least partially birds of passage; the short-eared owl is an example.

For an account of the numerous species of owls of the United States consult Baird, Brewer and Ridgway, *North American Land Birds* (1874).

OWN, v. *ōn* [AS. *unnan*, to grant: Icel. *unna*, to grant, to allow: Ger. *gönnen*, to grant]: to grant; to admit; to avow; to confess. OWNING, imp. *ōn'ĭng*. OWNED, pp. *ōnd*, avowed; confessed. *Note.*—OWN 2 in its origin is quite distinct from OWN 1, but the words have become inextricably confused. The old sense was 'to grant as a favor,' hence 'to grant as an admission.'—See SKEAT.

OWN, a. *ōn* [from OWE: AS. *agen*, own: Icel. *eigin*, one's own; *eiga*, to possess: Goth. *aigin*, property]: belonging to, or that belongs to; peculiar; possessed; used after the poss. pronouns my, thy, his, her, our, your, their, to render them emphatic, as, our *own:* V. to hold or possess by right. OWNING, imp. *ōn'ĭng*. OWNED, pp. *ōnd*, possessed. OWNER, n. *ōn'ẽr*, the rightful proprietor. OWN'ERSHIP, n. proprietorship; rightful or just claim or title. Ownership is the dominion of a thing real or personal, which one has the right to enjoy and to do with as he pleases, even to spoil or destroy it as far as law permits, except that he is prevented by some agreement or covenant restraining such right. An owner continues to have the same right although performing no acts of ownership, and although another may perform such acts without his knowledge or against his will; but an owner may lose his right in a thing if he permit it to remain in the possession of a third person for sufficient time to enable the latter to acquire a title thereto. Any thing or property may be the subject of a joint ownership by two or more persons having an equal right to it. Ownership as applied to one's title to property is the right by which a thing belongs to a particular person to the exclusion of all others. The foundation of ownership is possession, but it is not sufficient as against one who can show a better right.

OWOSSO, *ō-wŏs'ō:* Mich., city in Shiawassee County; on the Shiawassee River, and on the Grand Trunk, Michigan C., and Ann Arbor R.R.'s; about 80 miles west by north of Detroit and 30 miles north by east of Lansing. It was settled in 1836 by A. L. and B. O. Williams and Elia Comstock, and chartered as a city in 1859. It is in a farming region and has considerable manufacturing interest. The chief industrial establishments are furniture factories, which have about 650 employees; casket factory, 150 employees; screen door and window factory, 200; car shops, 150; sugar works, 75; miscellaneous, about 55. The prominent public buildings are the churches and schools. It has Oakside school, a business college, and a ladies' library. There are eight churches. The three banks have a combined capital of $300,000. The charter of 1895 provides for a mayor, who holds office one year, and a council of 10 members. The waterworks are owned and operated by the municipality. Pop. (1900) 8,696.

OX, n. *ŏks*, OXEN, n. plu. *ŏks'n* [AS. *oxa;* Dan. *oxe;* Ger. *ochse;* Lap. *wuoksa;* Turk. *oyys*, an ox]: general name for animals of the bovine or cow kind; strictly, a gelded male of that kind at or near his full growth (see below). OXLIKE, a. like an ox. OXBIRD, a bird, a species of sandpiper. OXBOW, the yoke for an ox. OXEYE, the large wild daisy, known as *Chrysan'thĕmum leucan'thĕmum*, ord. *Compositæ* (see CHRYSANTHEMUM): a little bird called the great titmouse. OX-EYED, having large eyes like the ox. OX-GALL, the bitter fluid secreted by the liver of the ox, used for scouring cloth, and by artists, after it has been refined, to give tenacity and fluidity to their colors. OXGANG [Scot. and prov. Eng. *gang*, to go]: as much land as an ox can plow during the proper season, reckoned from 15 to 20 acres. OX-STALL, a covered place for oxen. OXLIP, n. *ŏks'lĭp*, plant growing about hedges and borders of fields—so called from the fancied resemblance of the flowers to the lips of an ox; a kind of Primrose (q.v.), the *Primŭla elātĭŏr*, ord. *Primulācĕæ*.

OX (*Bos taurus*): ruminant quadruped of family *Bovidæ* (q.v.), the most useful to man of all domesticated animals. The species is distinguished by a flat forehead, longer than broad; and by smooth and round tapering horns, rising from the extremities of the frontal ridge. But among the many varieties or breeds, there are great diversities in the length and curvature of the horns, and some are hornless. It is probable that the ox is a native both of Asia and of Europe, perhaps also of Africa; and not improbable that it may have been domesticated at different times and in different countries. It cannot be confidently asserted that it now exists anywhere in a truly wild state; wild oxen are nowhere so abundant as on the pampas or great grassy plains of S. America, where it is certain that they are not indigenous; and it is not impossible that the wild oxen still existing in the parks of a few noblemen in Britain also may be descended from domesticated animals. On the question whether the URUS, described by ancient authors as an inhabitant of central Europe, was the original of the domestic ox, see URUS. The very early domestication of the ox is attested by the mention of it in the writings of Moses and of the ancient Hindus, by figures cut on Egyptian monuments 4,000 years ago, and by remains found in the Swiss lake dwellings of the stone age. In the early ages, the ox was a standard of value, and in semicivilized regions is still used in financial transactions. Abraham, Jacob, and other patriarchs had large herds of cattle; the Egyptians and Hindus venerated the bull, and it is frequently mentioned in the mythology of the Greeks and Romans. The ox was used for labor at a very early period; and though the milking qualities of the cow were only slightly developed as compared with modern times, the milk was a highly valued product. In civilized portions of Africa and Asia, in most European and S. American countries, and to some extent in the United

States and Canada, the ox is employed for farm labor. Varro, Bolumella, and other ancient Latin writers on agriculture, gave full directions for the care of oxen and the methods of training them for work. Though slow and liable to suffer from the heat of midsummer, the ox is strong and docile, is easily taught; and for working among stumps or rocks, in mud or in deep snow, is superior to the horse. In the lumber regions, and in the thinly settled portions of the e. part of the United States, many oxen are used, but in the vicinity of large towns and cities they have been largely superseded by horses. In the great farming regions of the central and w. parts of the country, oxen have never been extensively employed. The genus is valuable pre-eminently for flesh and milk; but the hide is made into leather, the horns into combs and other articles of use and ornament, the bones into fertilizers, the hoofs into glue, the hair is used in mortar, and the other portions of the animal are made to serve some useful purpose. Even where its labor is not required, it is invaluable to man, and in the early stages of civilization was one of the chief means of enabling him to subdue the earth and promote his material advancement. The period of gestation is about 285 days, but variations from 240 to 301 days sometimes occur, and the period is usually a little longer with a male calf than with a female. Twins, and even triplets, are sometimes produced; but there is seldom more than one calf at a birth. Some breeds mature earlier than others; but the period of growth ranges from 3 to 5 years, and of life from 18 to 25 years. Unless they are exceptionally hardy and valuable animals, cows for the dairy (see Dairy) should not be kept after they are 10 or 12 years old, and many cannot be profitably kept as long; but some cows remain productive until they are 15 or 20 years of age. The ox is naturally gregarious, and in a wild state runs in large herds. On the vast plains of S. America, great numbers feed together, and when attacked by ferocious animals defend themselves vigorously. The cows and calves form the centre of a group, and the bulls face the foe, which they not infrequently destroy with their horns. It is supposed that these cattle descended from 7 cows and one bull which were taken from Spain to Paraguay about 1556. They are more easily domesticated than the semiwild cattle of Texas. The different breeds of cattle vary greatly in size, color, productiveness, and in adaptation to certain conditions of soil and climate. Some very small breeds occur in n. latitudes (e.g., the Shetland, found in small numbers in Great Britain) and in tropical regions. By some the small and humped cattle of the torrid zone are considered a different species from the common ox, though by others they are regarded as a variation from the ordinary type. The wild cattle kept in a few English parks are descended probably from the stock owned by the Britons at the time of the invasion by Cæsar. Those at Chillingham are particularly interesting; but it is probable that

their uniformly white color is due largely to a long-continued process of selection, the keepers of the park having destroyed all party-colored calves. They are rather small and handsome creatures, with sharp and nearly straight horns. The Shetland breed, which originated probably in Scandinavia, is very small, the cow being little larger than a long-wooled sheep. The animals are very hardy, mature early, fatten readily, and make good beef; and the cows give a good quality of milk. Though useless where pastures are rich, they are well adapted to the barren region in which they are kept. A black breed known as the Kyloe or West Highland cattle, except in color resembling the Chillingham, is kept in small numbers in the Highlands of Scotland. It is very hardy, and the milk is rich, though too small in quantity to make the cows profitable for the dairy; but the beef is of superior quality. In Wales, the Pembroke and a few similar breeds are kept. They are hardy, mature slowly, and resemble the West Highland cattle, though the cows are somewhat better milkers. The Kerry breed, known as 'the poor man's cow,' is a native of Ireland, and has long been kept pure. It is extremely hardy, of moderate size, and matures rather slowly. The color is usually black, the cows are good milkers, and the beef is superior. The Shorthorn (sometimes called Durham) cattle, originating in Durham and York counties, England, are the most popular breed in that country, and a favorite in the United States. It dates from about the middle of the 18th c., and has been bred with great care since 1780. The Colling brothers, Bates, Booth, and other famous breeders, made a wonderful improvement in the character of this breed. Previous to 1810, when the first public sale of Shorthorns was held, cows and bulls had been sold by the Collings for £100 each; and at this sale the bull Comet, 6 years old, brought 1,000 guineas. The first importations of this breed to the United States were made about 1785, when a few animals were brought to what is now W. Va., and others to N. Y. About 1800 they were introduced into Ky. The Shorthorns are hardy, vigorous, mature reasonably early, are excellent for beef; and in families in which the tendency to fatten has not been pushed to an extreme, the cows are good milkers. The oxen are very large and strong, intelligent and docile, but rather slow in their movements. As a 'general purpose' breed, for milk, butter, cheese, beef, and labor, it is of great value, and it adapts itself readily to variations of soil and climate. It is extremely valuable also for breeding, and when crossed upon the so-called native stock produces an immediate and marked improvement. The grades often make good milkers, take on flesh readily, and make a good quality of beef. In the middle states, O., and the famous stock regions of Ky., Shorthorns are very numerous, but are not confined to these portions of the country. The color of the Shorthorn varies from roan to red or white. The breed has been brought to a high degree of perfection

in the United States, and many fine animals have been purchased and shipped to England for breeding purposes. At a sale at New York Mills 1873, a Shorthorn cow was sold for $40,600, and a calf of the same breed, only five months old, brought $27,000. The Hereford breed has been developed principally from the cattle common in the county of Hereford, England, at the opening period of modern agriculture. Benjamin Tomkins made a wonderful improvement in this breed, commencing about 1766 and continuing till his death

Bull (Shorthorn).

1815, during which period the present characteristics of the breed were firmly fixed. The Hereford is large, red, with the distinguishing mark of a white face, hardy, matures rather early, is readily fattened, and makes beef of excellent quality. The cows are not specially valuable for milk, the efforts of breeders having been given almost exclusively to the development of the fattening quality. The Devon is claimed to be the oldest of the pure breeds. It had reached a high degree of excellence 1776, and several noted breeders have made improvements since that date. The color is a dark, solid red, and the horns are long, but smooth and graceful. The oxen are strong, active, tractable, and unsurpassed for work; the quality of the beef is excellent, and the cows are fair milkers. As a 'general purpose' breed, it compares favorably with the Shorthorns. It is quite desirable where the pastures are of only moderate fertility and the climate is rather severe. The Norfolk, known also as the Suffolk and Suffolk Dun, is an English breed, without horns, but in other respects resembling the Devons. The cows are good milkers, and the fattening qualities of the breed are excellent. The Sussex is a large red English breed, which thrives on rather short pastures, is moderately good for milk, but valuable for beef. The Longhorn breed, formerly popular in England, but now largely superseded, is large, coarse, with very long horns and only moderate milking

capacity. Blakewell, the famous breeder, is said to have begun his work of improvement with this breed. The Ayrshire, an excellent dairy breed which thrives over a wide range of territory and under greatly differing conditions, originated in Scotland, was brought to a high degree of excellence in the last half of the 18th c., and has since been bred with great care. It is of medium size, brown, brown and white, or red and white, not specially useful for beef, but of great value for the dairy. The cows are vigorous, and yield large quantities of milk which makes good butter and is superior for cheese production. It is a useful breed for crossing with native stock. The Aberdeen-Angus also is an old Scotch breed, but persistent efforts to improve it were not made until about 1800. The animals are black, hornless, and grow rapidly, the quality of the milk is excellent, and some families yield large quantity; but the breed is valuable specially for beef. In competition with a great number of other breeds, this won the first prize as a beef-producing breed at the world's fair, Paris, 1878, and won 61 of 63 prizes at the Kansas City and Chicago fat-stock shows 1887. The Galloway is a Scotch breed of great age and value. The animals are black, hornless, have thick skins, do not mature very early, but are quite hardy. The Holstein-Friesian (under which name breeders now include the Holstein, Friesian, and Dutch cattle) is a large black-and-white breed which originated and is still the favorite in n. Holland, and is said to be equal to the Shorthorn for feeding, and superior to the Ayrshire for milk. It is quite popular in the United States. The Dutch belted cattle are black and white, with the white, in the form of a belt around the body. They originated in Holland, are smaller but otherwise similar to the Holstein-Friesian, but require less luxuriant pastures. They are quite common in Orange co., N. Y., and there are numerous herds in other states. The Swiss cattle are of good size, brown color, hardy, vigorous, remarkably gentle, good feeders, and the cows yield a fair quantity of very rich milk. The Jersey, Alderney, and Guernsey cattle are from the Channel Islands, from which they receive their names. Of these the Jersey has been most widely distributed. It has been bred with extreme care for more than a century. It is pre-eminently a dairy breed. The animals are of only medium size, of fawn-color varying from light to dark and mixed with white, with fine heads, small horns, yellow skins, and a graceful form. A fair quantity of very rich milk is produced, from which the finest quality of butter is made. The cows are docile, but the bulls often prove treacherous and vicious. There are now more pure-bred Jerseys in the United States than in their original home. The Alderney resembles but is hardly equal to the Jersey. Very few Alderneys have been brought to this country. The Guernsey is larger and coarser than the Jersey, gives more milk, and is said to average more butter. The

color is yellow, the cows are very gentle, and the bulls are more tractable than the Jerseys. There are comparatively few in the United States, but many have been taken to England. None of the Channel Islands cattle are desirable for beef. The Texan cattle, on the ranches in the w. United States, are descended from Spanish cattle which were brought to Mexico about 1525 by the early explorers of that region. They are coarse, are not readily tamed, and the cows give little milk; but they are quickly and wonderfully improved by crossing with the Shorthorn or some other established breed. What is known as native stock, which includes the mass of the cattle in the United States, is descended from early importations of cattle of different breeds from various portions of Europe. It contains many valuable animals and large numbers of cows useful for crossing with thorough-bred bulls. The bulls are not desirable for breeding. The first importation of cows into what is now the United States was made to Va. 1607. For some time the wilful destruction of a cow was punishable with death. Edward Winslow, afterward gov. of Plymouth colony, imported the first cattle into New England 1623. About 1625 the Dutch colonists of N. Y. imported a few cows from Holland; some time afterward there were importations from Denmark; and Swedish settlers in Del. brought over a few cattle 1627. Settlers in N. H., Penn., Md., and the Carolinas also brought cattle with them from their homes, or sent for them after reaching this country. Change of climate, scanty feeding, and want of protection from cold and storms, led to a marked deterioration in quality. Toward the close of the 18th c., small importations of improved breeds were made; but the first systematic and widely spread attempt to improve the character of live-stock in this country seems to have been about 1825. The Devons were then introduced into the east, and Shorthorns, Ayrshires, and Jerseys were imported. The financial panic 1837 checked importations, but the improved stock increased in numbers and was widely distributed. For about 10 years from 1850, large importations were made, and since the close of the civil war have been common. Of late, many fine animals for breeding and large numbers of beef cattle have been exported.

From a very early period, the cow has been cared for by man on account of her milk (see DAIRY), which is of itself an almost invaluable article of diet, and can be made into butter and cheese (see BUTTER: CHEESE)—important food products. Both cows and oxen are used for beef. It is easy to find a breed suited to any purpose and adapted to any locality. Upon the selection of a breed the success of the stock-keeper will largely depend, as adaptation to the conditions under which animals are to be kept is almost as important as inherent merit. Pure-bred cows are not absolutely required, but the use of thorough-bred bulls for breeding purposes is imperative.

OX.

The keeping of cattle is one of the most widely distributed and rapidly increasing of the agricultural interests in the civilized world; and in half-civilized regions oxen are used as beasts of burden, for draught, for riding, and are even trained for war. In the United States, great improvement in dairy stock and beef production has been and is still being made, but much remains to be done. The best calves should be raised and carefully fed (see DAIRY). Training for work should begin when the steers are quite young. They should always be kindly treated and petted, so that they can be easily handled. A small yoke may be put on their necks and the process of teaching may be considerably advanced before they are a year old. They may soon be made to draw a light cart, but should not be required to move heavy loads until they are 3 or 4 years old. The load, at first light, may be increased with the strength and experience of the animals. Care should be taken not to overload, and the oxen should be kindly treated. When at work, they should receive grain with their hay, and be supplied with pure water. In winter, or if worked on stony roads in summer, they will need shoeing. If well fed and kindly treated, the ox will do much work without losing flesh. Fattening of cattle may be done in pastures or in stalls. In the former case, the beef is known as 'grass-fed,' and in the latter as 'stall-fed.' To the profitable conducting of the former method, good Pastures (q.v.) are required; but a deficiency in this respect can be partially remedied by a system of soiling (see SOILING OF CATTLE). For fattening in the stall, hay and grain, ensilage, or roots, will be required in liberal quantities. A mixed diet is far better than any single article of food. In the United States, corn is the chief reliance for feeding; but cotton-seed meal, oil meal, and various other substances are largely used. The feeding should be regular, and be continued till the fattening process is completed. It is important that the animals have good care and protection from extremes of temperature. The breeds which mature early and fatten easily are to be selected for feeding. Young cattle can be fattened more readily and more profitably than old ones; but after oxen have passed their prime for work, and cows have become too old to be profitable as milkers, they may, by high feeding, be made into a fair quality of beef. When properly cared for, the ox is subject to but few diseases. Good food in suitable quantities and a reasonable degree of care and protection will nearly always keep the animals in thrifty condition.

During 1880-90 the cattle in the United States increased in number nearly 60 per cent., and at the close of the period reached about 57,000,000 head. In 1907 there were in the United States 20,968,265 milch cows valued at $645,496,980, and 51,565,731 other cattle valued at $881,557,398. Exports to Europe vary greatly according to the market prices, in 1906 the exports being 584,239 head, valued at $42,081,170.

OXALATE, n. *ŏks'ă-lāt* [L. *oxălis*, a kind of sorrel: Gr. *oxalis*, a sour wine, sorrel—from *oxus*, sharp, keen]: in *chem.*, a salt of oxalic acid. OXALIC, a. *ŏks-ăl'ĭk'*, pertaining to sorrel, or from it. OXALIC ACID, called also 'salt of sorrel,' a dry poisonous acid (see below). OXALIS, n. *ŏks'ă-lĭs*, genus of plants having an acid taste; the common wood-sorrel (see OXALIDEÆ). OX'ALITE, n. *-līt*, a native oxalate of iron, found in the brown-coal of Germany.

OXALIC ACID, *ŏks-ăl'ĭk ăs'ĭd* ($C_2H_2O_4$): important organic acid which exists ready formed in many plants as a potassium or calcium salt; it is produced by oxidation of a great variety of organic compounds. In the free state it occurs in *Boletus igniarius;* also, according to some observers, in the juice of the chick-pea; as a salt of potash it exists in the several species of *Oxalis* (whence *oxalic*) and of *Rumex;* as a salt of soda, in nearly all the species of *Salicornia* and *Salsola;* and as a salt of lime, in Rhubarb and many Lichens. It does not occur normally in the animal kingdom except in minute quantity and in combination with lime. Oxalate of lime is found in a crystalline shape both in healthy and in morbid urine. In the latter, it constitutes the leading symptom of the affection termed OXALURIA (q.v.), while in the former it occurs after the use of wines and beer containing much carbonic acid, of sorrel, rhubarb-stalks, etc., and after the administration of the alkaline bicarbonates. It is the constituent of the urinary calculus, known from its rough exterior as the mulberry calculus. Crystals of oxalate of lime have been found also in the mucus of the gall-bladder, on the mucous membrane of the impregnated uterus, and in morbid blood. They have likewise been detected in the biliary vessels and excrements of caterpillars. In the mineral kingdom, these crystals have been detected in association with crystals of calcareous spar.

In the production of O. A., the reaction in some cases consists in a definite substitution of oxygen for hydrogen: thus it is formed from ethene alcohol, $C_2H_6O_2$, by substitution of O_2 for H_4, and from ethyl alcohol, C_2H_6O, by the same substitution and further addition of one atom of oxygen. But in most cases the reaction is more complex, consisting of a complete breaking up of the molecule. In this manner, O. A. is produced in great abundance from the highly carbonized organic substances, sugar, starch, cellulose, etc., by the action of nitric acid, or by fusion with caustic alkalies. In the oxidation of sugar with nitric acid, $C_{12}H_{22}O_{11} + O = 6C_2H_2O_4 + 5H_2O$. One part of sugar is gently heated in a retort, with 5 parts of nitric acid of sp. gr. 1·42, diluted with twice its weight of water; copious red fumes are disengaged, and the oxidation proceeds with violence and rapidity. When the action slackens, heat may be again applied, and the liquid concentrated by distilling off the superfluous nitric acid, until it deposits crystals in cooling. These are drained,

redissolved in a small quantity of hot water, and the solution is set aside to cool. O. A. separates in colorless, transparent crystals, derived from an oblique rhombic prism, and consisting of $C_2H_2O_4 \cdot 2H_2O$. The two molecules of crystallization water may be expelled by a very gentle heat, and then the crystals crumble to a soft white powder, anhydrous O. A., $C_2H_2O_4$. The substance has an intensely sour taste and a most powerful acid reaction, and is highly poisonous.

In consequence of its employment in cotton printing, bleaching straw, etc., O. A. is more accessible to the general public than many other poisons, and instances of suicide by swallowing it, and of accidental poisoning by its being sold by mistake for Epsom salts, are not very rare. In large doses it destroys life very rapidly: Dr. A. Taylor mentions a case in which a man died in 20 minutes after taking two ounces. Dr. Christison records a case in which an ounce killed a girl in 30 minutes, and another case in which the same quantity destroyed life in ten minutes; and, as a general rule (liable to exceptions), when the dose is half an ounce or upward, death follows within the hour. The symptoms are a hot or burning acid taste, with a sense of constriction or suffocation; vomiting, great pain in the region of the stomach, convulsions, cold perspirations, and general collapse speedily follow; and respiration shortly before death becomes slow and spasmodic. With the view of converting the free acid in the stomach into an insoluble and inert salt, chalk, whiting, or lime-water, with full draughts of milk, should be administered with the least possible delay. Salt of sorrel is almost as poisonous as the pure acid.

Like all other bibasic acids, O. A. forms, with monatomic metals, neutral or normal salts containing (M represents the metal) $C_2M_2O_4$, and acid salts, C_2HMO_4. With potassium and ammonium likewise it forms hyperacid salts, e.g., $C_2HKO_4 \cdot C_2H_2O_4$, or $C_4H_3KO_8$. With most diatomic metals, it forms only neutral salts, analogous to the hyperacid oxalates of the alkali metals. It also forms numerous well-crystallized double salts.

OXALIDEÆ, *ŏks-ăl-ĭd′ē-ē*, or OXALIDACEÆ, *ŏks-ăl-ĭ-dā′sē-ē:* natural order of exogenous plants, allied to *Geraniaceæ;* including herbaceous plants, shrubs, and trees; with generally compound alternate leaves; calyx of five equal persistent sepals; corolla of five equal unguiculate petals, spirally twisted in bud; ten stamens, usually more or less united by the filaments, in two rows; ovary usually 5-celled, with five styles; fruit a capsule opening by as many or twice as many valves as it has cells, or more rarely a berry; seeds few, attached to the axis. There are more than 300 known species, natives of warm and temperate climates. They are abundant in N. America and at the Cape of Good Hope. An acid juice is very characteristic of this order. Some of the tropical species produce agreeable acid fruits, as the Carambola (q.v.).—The genus *Oxalis* has a capsular

fruit, and the seeds have an elastic integument, which at last bursts open and projects the seed to a distance. The species are mostly herbaceous plants, with ternate or digitate—rarely simple or pinnate—leaves; a few are shrubs. The stems and leaves generally contain a notable quantity of *Binoxalate of Potash*, and have therefore a sour taste.—The Common Wood-sorrel (*O. acetosella*), very abundant in shady woods and groves in Britain and most parts of Europe and N. America, is a beautiful little plant, often covering the ground with its green leaves, amid which the white or slightly roseate flowers appear. Its leaves all grow from the root, a long leaf-stalk bearing three obovate leaflets; the scape bears a single flower. There is a subterranean scaly root-stock. On account of their grateful acid taste, the leaves are used in salads and sauces. The plant is very abundant in Lapland, and is much used by the Laplanders. It is antiscorbutic and refrigerant, and an infusion of it is a grateful drink in fevers. *Binoxalate of Potash* is obtained from the leaves by expressing the juice, and crystallizing; and is sold not only under the name *Salt of Sorrel*, but also of *Essential Salt of Lemons*, and is used for extracting spots, and particularly iron-marks, from linen, and for other purposes. Much of it is now, however, obtained from a very different source. See Oxalic Acid.—*O. corniculata*, a plant of very extensive distribution in Europe, N. America, India, Japan, and some of the African islands, has a branched stem, with decumbent branches, leaves very similar to those of the common wood-sorrel, and yellow flowers. Its properties agree with those of the common wood-sorrel. Many other species much resemble these in general appearance and properties. Some of the species exhibit an irritability like that of the Sensitive Plant, generally slight and only in hot sunshine; but *O. sensitiva*, an E. Indian species, with pinnate leaves, has this property in high degree. Some species of *Oxalis*, as *O. cernua*, native of s. Africa, are remarkable for producing large bulbels in the axils of the lower leaves. Several species have tuberous roots, and are cultivated for their tubers; as *O. crenata* and *O. tuberosa*, natives of Peru and Bolivia, where they are much esteemed, and both receive the name Oca. The tubers, when cooked, become mealy like potatoes. They have a slightly acid taste. *O. Deppei* is a Mexican species, with root somewhat like a small parsnip, quite free of acidity: it is much cultivated in its native country. *O. tetraphylla* and *O. crassicaulis*, natives of Mexico, and *O. enneaphylla*, native of the Falkland Islands, also have eatable roots. Many species of *Oxalis* are esteemed ornaments of gardens and greenhouses.

OXALURIA, *ŏks-a-lū′rĭ-a,* or The Oxal′ic Acid Diath′esis: morbid condition of the system, in which one of the most prominent symptoms is the persistent occurrence of crystals of oxalate of lime in the urine. These crystals occur usually as very minute transparent octohedra, but sometimes in the form of dumb-bells. To detect them, the urine, which usually in these cases presents a mucous cloud, should be allowed to stand several hours in a conical glass; and after the crystals have gradually subsided, the greater part of the fluid should be poured away, and the drops remaining at the bottom examined with a power of not less than 200 diameters. These crystals, insoluble in acetic acid, may occur either in acid or alkaline urine. Persons who secrete this form of urine are usually dyspeptic and liable to attacks of boils, cutaneous eruptions, and neuralgia. The occurrence of oxalic acid as a persistent sediment in the urine is not only an indication of an existing morbid condition of the system, but may give rise to a concretion of oxalate of lime (mulberry calculus), either in the kidney or the bladder.

The treatment is simple. Care must be taken that the patient avoid articles of diet containing oxalic acid (such as sorrel, rhubarb, tomatoes, etc.), or readily converted into it (such as sugar), and all drinks containing much carbonic acid; while he should take plenty of exercise in the open air, without fatiguing himself; should use the shower-bath, unless he feels chilled and depressed after its application, in which case he should rub the body all over daily with a horse-hair glove; and should employ as a tonic either a little nitro-muriatic acid in a bitter infusion, or five grains of citrate of iron and quinine three times daily.

OXAMIDE, n. *ŏks′ă-mĭd* [L. *oxălis,* a kind of sorrel, and Eng. *ammonia*]: a white substance, the product of the destructive distillation of oxalate of ammonia. Oxam′ic acid, *-ăm′ĭk,* a certain acid.

OXATYL, n. *ŏks′ă-tĭl* [Gr. *oxus,* sour, acid; *hulē,* material]: the radical of an important series of organic acids. See Carboxyl.

OXENBRIDGE, *ŏks′ĕn-brĭj,* John: 1609, Jan. 30—1674, Dec. 28; b. Daventry, Northamptonshire, England. He was educated at Oxford and Cambridge, graduating at Cambridge 1631. He took orders in the Church of England 1633, and soon went to Bermuda, where he assumed charge of a church. He returned to England about 1641, and in 1644 was ordained pastor of a church at Beverley, and chosen fellow of Eton Coll. He afterward took charge of a church at Berwick-on-Tweed, but was expelled from his living 1662 for nonconformity; he then went to Surinam, Guiana, as a missionary, remaining till 1667, when he removed to Barbadoes, and 1669 came to Massachusetts. He was ordained pastor of the First Church (Congl.), Boston, as colleague with the Rev. James Allen, 1670, Apr. 10. He

was a popular preacher, and published several religious works.

OXENHAM, John: English novelist. He was educated at Victoria University, Manchester, and was for some time resident in this country. Returning to England he gave up commercial pursuits in which he had been engaged and turned to literature. He has since published *God's Prisoner* (1898); *Rising Fortunes* (1899); *A Princess of Vascovy* (1900); *Our Lady of Deliverance* (1901); *A Modern Masquer* (1901); *John of Gerisau* (1902); *Under the Iron Flail* (1902); *Bondman Free; Mr. Joseph Scorer; Barbe of Grand Bayou* (1903); *A Weaver of Webs; Hearts in Exile* (1904); *The Gate of the Desert; White Fire* (1905); etc. He has also written many short stories for periodicals.

OXENSTIERNA, *ŏks'ĕn-shĕr-nâ*, Axel, Count of: Swedish statesman: 1583, June 16—1654, Aug. 28; b. Fanö, in Upland. He was educated for the clerical profession, and studied theology and jurisprudence at Rostock, Jena, and Wittenberg, taking his degrees in Wittenberg. Although he afterward applied himself to public affairs, he continued all his life to take a deep personal interest in religious questions, and labored zealously for the Prot. cause. After leaving the univ., he visited most of the German courts, but returned to Sweden 1603, and soon entered the service of Charles IX., who, 1606, dispatched him as ambassador to the court of Mecklenburg. He became a senator 1608—a dignity which 13 of his predecessors in the countship had held in uninterrupted succession. Having shown great prudence and wisdom in affairs, he was appointed by Charles—now infirm from age—guardian of the royal family and head of the regency. On the accession of Gustavus Adolphus (q.v.), 1611, Oxenstierna was made chancellor; and 1613 acted as minister-plenipotentiary in the negotiations for peace between Sweden and Denmark. In the following year he accompanied his sovereign to Poland, and by the peace of Stolbova, 1617, terminated hostilities between Sweden and Russia. His political sagacity was conspicuous in his successful efforts to prevent Gustavus from marrying Ebba Brahe, a Swedish beauty, and in bringing about a match between his master and Princess Maria-Eleonora of Brandenburg. In 1621, on the departure of the king for the Polish war, Oxenstierna was charged with administration of affairs at home; subsequently, he was appointed gov.gen. of the conquered districts; and 1629 concluded peace with the Poles, on highly favorable conditions. For a while, Oxenstierna strongly opposed the desire of Gustavus to take part in the 'Thirty Years' War,' his hope being to see Gustavus arbiter of north Europe; but when he found that the Prot. sympathies of the king were irrepressible, he set about collecting money and troops for the perilous enterprise, with all the quiet but wonderful activity and persistency that remarkably characterized him. After

Gustavus had fairly entered on the bloody struggle, O. joined him, and conducted most of the extensive and complicated diplomacy which the course of events entailed on Sweden. The death of Gustavus seemed for a moment to stun O.; but he instantly recovered, and heroically resolved to continue the contest with the imperialists, in spite of the visible disaffection of many of the German Prot. princes, among others, of the elector of Saxony. The will of the dead monarch was sent to Stockholm; according to its conditions, the government —during the minority of Christina (q.v.)—was intrusted to five nobles, who empowered the chancellor to prosecute the war. His difficulties were enormous, yet by indefatigable efforts he managed partly to allay the discontents, jealousies, and rivalries of the Prot. leaders. The disastrous defeat of the Swedes at Nördlingen 1634, and the perplexities which followed, would have stupefied most men in the position of O., but only called out more energetically his splendid diplomatic genius. Transferring the leadership of the Prot. forces to Duke Bernhard (q.v.) of Weimar, he went, 1635, to France and Holland, and formed alliances with these countries. Returning to Germany, he assisted in quelling a mutiny among the Swedish troops at Magdeburg; put Pomerania in a state of defense, to resist the attack of the elector of Brandenburg; renewed the treaty with Poland; and leaving Baner in command of the Swedes, returned to Stockholm 1636. He continued to direct the policy of the Protestants in Germany, till the peace of Westphalia, 1648, put an end to the war. O.'s son was one of the Swedish envoys who signed the treaty, and it is in a letter to him that the famous sentence of the statesman occurs, *Nescis, mi fili, quantilla prudentia homines regantur* ('You do not yet know, my son, with how little wisdom men are governed'). Christina, who had been declared of age 1644, did not show proper respect for the advice of O.; and after she had—through mere feminine wilfulness—abdicated in spite of all his protestations, he withdrew from public life, and died shortly after she had left Sweden. He entertained a genuine affection for the daughter of his noble master, and in his last moments her name was upon his lips. Some treatises and historical fragments are attributed to him, and his 'Journal' has been published in the 'Stockholm Magazine.' See Lundblad's *Svensk Plutarch* (2 vols. Stock. 1824); Fryxell's *History of Gustavus Adolphus;* and Geijer's *History of Sweden.*

OXFORD, *ŏks'ford:* ancient and famous city and seat of learning in England, chief town of the county of Oxford; 55 m. w.n.w. of London; lat. 51° 45′ 55″ n., long. 1° 15′ 29″ w.; on the n.e. bank of the Thames (here locally called the Isis), a little above the point where it is joined by the Cherwell. Both streams are crossed by numerous bridges, of which the finest are Folly Bridge over the Isis and Magdalen Bridge over the Cherwell. Pop. (1871) 34,482; (1881) 40,837; (1901) 49,413.

O. occupies an undulating site, is surrounded by rich and wooded meadows, and presents to the approaching visitor a scene of unequalled architectural magnificence —spires and towers and domes rising thickly. The four main streets of O. meet at right angles near the centre of the town, at a place still called Carfax, a corruption of *Quatre voies*, and which appears in Agas's map (*temp.* Elizabeth) as *Cater Voys.* These are—Cornmarket street, leading into St. Giles's, and running due n.; Queen street, leading to the railway stations, and running w.; St. Aldate's street, leading to the Isis, and running due s.; and High street, the chief street of the city, gracefully curving easterly, and conducting to the river Cherwell, which joins the Isis soon after it has passed Oxford.

The w. half of the town is the least interesting; and as the railway stations are here, travellers are introduced to the meanest parts of the city first. The county courts and jail, and the remains of the castle, from which Empress Maud escaped while it was besieged by King Stephen, will be observed in passing. There is one good street in this part—Beaumont street, on the site of the ancient Beaumont palace, in which Richard I. was born. At the end of this street is Worcester College. Passing n. from Carfax, along the Cornmarket, the old tower of St. Michael's Church is seen, against which stood formerly the n. gate of the city; next St. Mary Magdalen Church; then the Martyrs' Memorial, with the Taylor Buildings and Randolph Hotel on the left, and part of Balliol College and St. John's College on the right. St. Giles's Church is at the n. end of this street, which is very wide and has a row of elm-trees on each side, forming a picturesque avenue, like a foreign *boulevard.* Beyond this, to the n., are the Radcliffe Observatory and Infirmary. The High street is about 1,000 yards in length; it is reckoned one of the noblest streets —architecturally considered—in Europe, and contains, among other edifices, Magdalen College, the new Examination Schools, Queen's College, All-Souls' College, University College, and St. Mary's and All-Saints' Churches. Parallel to it is Broad street, in which are Balliol, Trinity, and Exeter colleges, the Ashmolean Museum, the Clarendon Buildings, the Sheldonian Theatre; and close by are the Bodleian Library, the Radcliffe Library, and Brasenose College. In St. Aldate's street, which forms the s. part of the series of streets above mentioned as forming one n. and s. line, is Christ-Church

College (the entrance tower of which contains the great bell 'Tom of Oxford,' weighing more than 17,000 lbs.) and St. Aldate's Church. The other colleges and important buildings connected with the Univ. of O. lie back from the principal streets. Though there is nothing extraordinarily fine about the architecture of the colleges regarded individually, yet the vast number of the structures and the variety of styles present a *tout ensemble* altogether sublime. The effect is wonderfully heightened by the interspersion of gardens, meadows, and venerable trees—old as the buildings that tower above them. Christ-Church is celebrated for its magnificent hall, picture gallery, and library, as well as for its extensive grounds; its chapel, the cathedral church of O., is Norman in style, but is inferior, in both size and beauty, to most English cathedrals. Merton College is a little s. of the High street, and still retains the original chapel and part of the other buildings erected by Walter de Merton in the 13th c. Magdalen College retains its celebrated cloister and tower of the 15th c., and its buildings are the most complete of any college in Oxford. Oriel College, a comparatively modern structure, is very picturesque, but far from chaste in design; New College ranks among the noblest buildings in the city—'the chapel, the hall, the cloisters, the groined gateways, and even some original doors and windows remain, in their exterior at least, as they came from the hand of their master-architect,' William of Wykeham, 500 years ago; Queen's College is in Grecian architecture, with a spacious and handsome chapel and a fine library; so is Trinity College; University College is a pleasing mixture of Gothic and Italian; Exeter College has a splendid frontage on the w., and its chapel (built 1857-8), in Gothic style, is the finest modern building in the city; it has also an excellent hall and a beautiful library; Balliol College has a remarkably fine chapel, built a few years ago. Among churches in O., besides the cathedral church and the college chapels, are—St. Mary's, attended by the members of the university; St. Martin's, the church of the corporation of O.; St. Peter's-in-the-East, with a Norman crypt; St. Michael's, with a Saxon tower; and St. Aldate's. The chief buildings connected with the univ., besides the Bodleian and the Ashmolean Museum above mentioned, are the Radcliffe Library, a circular structure, adorned with Corinthian columns and surmounted by a dome; the Radcliffe Observatory, crowned by an octagonal tower; the University Printing-office, the Taylor Institution, the Union Debating-rooms, and the New Museum. The Botanic Gardens are nearly opposite Magdalen College. Other notable buildings are—the Town Hall, the Radcliffe Infirmary, the County Gaol, and a Wesleyan and a Congl. chapel. Lady Margaret Hall and Somerville Hall, founded 1879 for women availing themselves of the lectures of the Oxford assoc. for promoting the higher education of women, are not officially connected

with the university, though conducted in a practical correspondence with it.

O. is a mart for the agricultural produce of the neighboring country, but has little trade of its own, and is dependent for its prosperity chiefly on the university. It is a municipal and parliamentary borough, and governed by a mayor, nine aldermen, and thirty councilors, whose jurisdiction, however, does not embrace the university. The university sends two members to parliament; the city now sends only one.

O., by the Saxons called Oxnaford, and, in *Domesday Book, Oxeneford* (probably 'a ford for oxen'), is a place of great antiquity. The date of its origin is unknown, but as early as the 8th c. there was a nunnery here; and in 802 an act of confirmation by Pope Martin II. describes O. as an ancient seat of learning. It is said to have been a residence of King Alfred; also of Canute, who held several parliaments within its walls. The townsmen closed their gates against William the Conqueror, who stormed the town 1067, and gave it to one of his followers, Robert d'Oyley, who built a castle here to overawe the disaffected Saxons: some ruins of the castle are still seen. The paction that terminated the strife between Stephen and Henry II. was drawn up at Oxford. In the reign of Edward III., the preaching of Wickliffe excited great commotion among the students, and threatened almost the dissolution of the university. In the reign of 'Bloody Mary,' O. witnessed the martyrdoms of Ridley, Latimer, and Cranmer; and during the great civil war of the 17th c., it was for a while the headquarters of the royalist forces, and was conspicuous for adherence to Charles I. See OXFORD UNIVERSITY.

OX'FORD BLUES: see HORSE-GUARDS, ROYAL.

OX'FORD CLAY: principal member of the Middle Oolite series; a bed of stiff dark-blue or blackish clay, sometimes reaching a thickness of 600 ft. In its lower portion in some places are layers of tough calcareous sandstone, called Kelloway Rock, from a place in Wiltshire, England, where it is quarried. The O. C. lies beneath the plain on which Oxford is built, and extends s.w. and n.e. from the shore at Weymouth to the fenlands s. of the Wash; thence it may be traced through Lincoln into Yorkshire, until it disappears under the sea at Scarborough. The close packing of the fossils in the fine compact clay has caused them to be beautifully preserved; the shells frequently retain their iridescence, and even the softer parts of the cephalopods have sometimes left with tolerably clear definition their form in the clay. The fossils are, however, often filled with iron pyrites, which, on exposure to the atmosphere, readily decomposes and destroys all traces of the beautiful organism. The remains of chambered shells of the genera belemnites and ammonites are very abundant, with other shells, interesting crustacea, and the species of fishes and reptiles characteristic of the oolite.

OXFORDSHIRE, *ŏks'ford-shĕr:* inland county of England, bounded s. by the river Thames, e. by Bucks, w. by Gloucester; greatest length 52 m., breadth varying from 7 to 27½ m.; about 756 sq. m. = 483,621 acres. The surface, where not level, is undulating. In the n.w. the hills rise in Broom Hill 836 ft. above sea-level, and in the s.e. of the county are the Chiltern Hills (q.v.), rising near Nutfield to 820 ft. in height. O. is watered along its s. border by the Thames, and the other chief rivers are the Windrush, Evenlode, Cherwell, and Thame, affluents of the Thames. By means of the Oxford canal, which joins the Thames at Oxford, the towns and districts lower down the river (Abingdon, Wallingford, etc.), are supplied with coal from the Leicestershire coal-fields. The climate is healthful, but generally colder than in other parts of s. England. The soil is fertile; agriculture is advanced, 417,606 acres being under crops, fallow, or grass 1881; and the county is one of the most productive in the country. Pop. (1881) 179,559; (1891) 185,938; (1901) 137,118.

OX'FORD TRACTS: see TRACTARIANISM.

OX'FORD UNIVERS'ITY: ancient institution of learning in England, said to have been founded by King Alfred (d. 901). Without claiming for it an origin quite so ancient, we know that it is one of the three oldest universities in Europe—Paris and Bologna being the other two; and that, from very early times, students resorted to Oxford to attend lectures there delivered by learned men, and that they lived in the houses of the townspeople. In some cases they combined together to secure the service of a common teacher, with whom they lived in a large tenement called an inn, hostel, or hall. For a long time, however, the great majority of the students lodged in rooms hired from the citizens; and as late as 1512, regulations were made for the governance of such students. As their numbers increased, the halls were multiplied. Anthony Wood states that he could show the names and places of more than a hundred. The univ. seems to have grown up in the 12th c. A great diminution in the numbers of the students took place about the middle of the 15th c. This, among other causes, led to the gradual disappearance of the halls, which were bought up by the wealthier colleges. Only five of the halls remain, which differ from the colleges only in being unincorporated, and having little or no endowments. Residence in private lodgings had also fallen into disuse; and by the time of Queen Elizabeth, it had become a compulsory rule that all undergraduates should reside in some college or hall, at least for the first 12 terms of residence. Now, however, undergraduates may in most colleges live in lodgings from the beginning of their course.

The colleges were founded at various periods, from the end of the 13th c.: two-thirds of the number were founded before the Reformation. Their object origi-

nally was to support limited societies of students, who were to devote their lives to study—not, as at present, to educate large classes of the community. Students other than those on the foundation seem not to have been regarded by the founders as an essential part of the college. The colleges arose partly instead of the old halls, and partly at first as connected with the monasteries, by means of which institutions benevolent persons were enabled to give permanent support to poor secular scholars. University and Balliol, which now rank as the oldest colleges, were in fact halls supported by endowments held in trust for the maintenance of their students. The originator of the collegiate system, in anything like its present form, was Walter de Merton, who, besides having founded Merton College, is entitled to the honor of having mainly contributed to fix the university in its present site. All those on the foundation of the colleges before the Reformation were called Clerici. The great majority of the fellows were required to take priest's orders within a certain period after their election. This requirement of course involved celibacy, which, besides, was expressly imposed in some colleges; and practically, in old times as now, was enforced by the rule of life and the obligation of residence. Within the last few years, in some of the colleges the restriction of celibacy has been, under certain conditions, remitted in the case of fellows engaged in college work.

Under a statute passed 1868, any person may now become a member of the university without becoming a member of a college or hall, if he satisfies certain disciplinary requirements. For such purposes, these unattached students, known as 'non-collegiate,' are under the control of a board of delegates; but no special provision is made for their instruction. In 1871 the new foundation of Keble College, in memory of John Keble, was admitted to the same privileges (except as regards the academical status of its head) as are possessed by the existing colleges and halls.

The govt. of O. U. is vested in three bodies: (1) Hebdomadal Council, meeting weekly, consisting of the chancellor, the vice-chancellor, the two proctors, six heads of houses, six professors, and six members of convocation of not less than five years' standing—these heads, professors, and members of convocation being elected by congregation, and holding office six years. (2) Congregation, consisting of all the great officers of the univ., the professors, the public examiners, and all resident masters; which body now has the power of accepting or rejecting, and of amending, any statute framed by the hebdomadal council. (3) Convocation, consisting of all Masters of Arts, a body whose consent is necessary before any of the measures proposed by the hebdomadal board become law, which elects the chancellor, the two representatives of the univ. in parliament, and several of the professors, and which dispenses the ecclesiastical patron-

age of the university. The students not on the foundation are mostly commoners. In Worcester College and the halls there is still a class of fellow-commoners, who pay larger fees and have certain privileges. They consist mainly of men above the ordinary age of undergraduates, who wish to have the intellectual advantages of the univ. without being subjected to the common routine of discipline. All other formal distinctions due to wealth or poverty are almost entirely abolished—such as the special privileges of peers, and the regard had to the poverty of candidates in the case of certain scholarships. It is said to be very difficult to ascertain the actual number of students at any one time in Oxford; but, with the list of the colleges, with their respective heads, given at the end of this article, is a recent report of the number of undergraduates in each college.

There are four terms in each year—Michaelmas Term, Oct. 10—Dec. 17; Hilary Term, Jan. 14 to the day before Palm Sunday; Easter Term, Wednesday in Easter week to Friday before Whitsunday; Trinity Term, Saturday before Whitsunday to Saturday after the Tuesday first in July. Full Term, as it is called, does not begin till the first day of the week after the first congregation is held. By undergraduates, Michaelmas and Hilary terms are kept by six weeks' residence, and Easter and Trinity terms by three weeks each; but more than this is required by most of the colleges. 24 weeks may be taken as the ordinary *length of the academic year.* 12 terms of residence are required for the degree of B.A. from all. The degree of M.A. is obtainable in the 27th term, after matriculation. The following examinations have been necessary for a degree in arts since 1850; though new statutes which came into effect 1873-4 have considerably modified their nature: 1. Responsions, called 'Little Go' or 'Smalls' in the familiar language of undergraduates, are obligatory on all: most colleges require their members to pass responsions within their first year of study. 2. The First Public Examination, or Moderations, is obligatory on all: candidates must have entered on their fourth term: honors are awarded both in classics and in pure mathematics. 3. The Second Public Examination held twice a year, to be *passed* not earlier than the 12th term, and for honors not later than the 16th term of standing; unless the candidate has been classed in some other school of the Second Public Examination, in which case he may be admitted up to the 20th term inclusive. This examination consists of three parts: (1) an examination in the rudiments of faith and religion, or, in the case of those who (or whose guardians) object to such examination, certain substituted books or subjects: this examination is required of all candidates for the degree B.A.; (2) an examination of those who do not seek honors; and (3) an examination for those who do seek honors. In this last there are, in Oxford phraseology, six schools: Literæ Humaniores, Mathematics, Natural Science, Jurispru-

dence, Modern History, Theology. Candidates are entitled to a degree of B.A. who, having passed the two previous examinations, passed also the examination appointed for those who do not seek honors, or who obtain honors in any one of the six honor-schools. Candidates for honors may select any one, or more than one, of the six schools. The most popular of these is the school of Literæ Humaniores, in which the examination includes: (1) Greek and Latin languages; (2) histories of ancient Greece and Rome; (3) logic, and outlines of moral and political philosophy. Next in numbers of candidates is the school of Modern History. The organization of these six schools is at present the main function of the university as distinct from the colleges. Professorial teaching on its own account exists only to a very limited extent: in the main, the teaching power of the colleges is applied to preparing their undergraduate members for these various examinations.

Examinations take place also for degrees in law, medicine, divinity, and music; but these are in great measure formal. The examinations for degrees in arts are the proper work of the university.

Besides these honors, various distinctions are conferred by the university. There are several univ. scholarships, particularly the Vinerian law fellowships and scholarships; the Eldon law scholarship; one Sanskrit and two Hebrew scholarships yearly; two mathematical scholarships; the Hertford scholarship, for encouragement of the study of Latin; and the Ireland and Craven scholarships, for encouragement of the study of classics. There is also the Newdigate prize for the best composition in English verse, and the three chancellor's prizes for the best compositions in Latin verse, Latin prose, and English prose; the Gaisford prizes for Greek composition; and the Arnold, Stanhope, and Marquis of Lothian's prizes for the best essays on a historical subject. But the great prizes are the scholarships and the fellowships. These are now for the most part thrown open, and are awarded after examination without restrictions as to kin or place of birth; though at All-Souls', and also at St. John's College, an attempt has been made to keep up the former exclusiveness. The scholarships, so numerous as to be within the reach of any young man of ability, range from £60 to £80 a year, with rooms free, providing for a large part of the expense of a univ. education. At the close of this education come the fellowships; and it has been calculated that, when the arrangements of the commissioners who are introducing reforms are complete, there will be between 20 and 30 fellowships, mostly about £300 per annum, open yearly to competition.

Oxford is fed chiefly from the great English schools. A close connection subsists, by the terms of the foundation, between Winchester and New College, between Westminster and Christ-Church, and between Merchant Taylor's and St. John's: see the titles of these colleges.

OXFORD UNIVERSITY.

A student desirous of going to Oxford must apply to the head of the college to which he wishes to belong. Application in former times had to be made early, as all the good colleges were filled several years in advance. But now that undergraduates are allowed by most colleges to live in lodgings from the first, a candidate can have no difficulty in securing admission even to a distinguished college at short notice. There is no *university* examination at matriculation; but all the good colleges have such an examination before they receive any one—the standard of the examination, of course, varying with the college. After being received into the college, the undergraduate is sometimes assigned to a college tutor, who exercises a special control over his reading; but he also attends the instruction of the other college tutors or lecturers, as the course of his studies may require. The cost of tuition varies at different colleges, but an average of £65 may be given as paid by the undergraduate during his whole career: this payment is at some colleges distributed over three, at others over four, years. Besides this, almost every undergraduate finds it necessary, at some period before taking his degree, to read with a private tutor, whom he chooses for himself. Private tuition has grown to be quite an institution in Oxford, though not formally recognized. Many of the ablest young men, after taking their degree, remain in Oxford for a year or two, taking private pupils. In this way an undergraduate, even of a badly taught college, could secure the advantages of the best tuition. But during the last few years, the lecturers in different colleges have more and more combined and systematized their work; and thus to some extent obviated the need for private tuition. Much discussion has taken place on the merits and faults of this system; but, on the whole, it must be allowed to be useful for the tutor, as clearing up and concentrating his knowledge, while, at least to undergraduates who read for honors (with a few rare exceptions), it may be considered as absolutely necessary. Private tutors usually charge £10 a term for three hours a week. Previous to 1852, the professoriate of Oxford was strictly ornamental. A great effort was then made to stir it into life, which has been partially successful. New professorships were created, and the endowments of old ones were increased by the commissioners, under 17 and 18 Vict. c. 81. But the former of these measures, at least, whatever it may have done for the interests of science, has produced little effect on the undergraduates. They still limit their range of studies by the requirements of the examinations of the schools, and they can scarcely be expected to do otherwise. But professorial teaching has undoubtedly become more popular in the ordinary branches of study. Lectures by the professors of law and modern history, of moral philosophy, logic, Greek, and Latin, are felt to be useful, and are therefore well attended. Considerable changes in the univ. system have

been introduced since 1881, in accordance with the reforms suggested by the univ. commissioners—e.g., that professors should do more of the teaching, and that fellowships should be more numerous, of less value, and of shorter tenure than at present. The expenses vary at different colleges, not only indirectly from the tone of the society, but even directly from the charges made for necessaries. A man should be exceedingly comfortable at Oxford with £200 a year; on £150, he can manage with economy. There have been instances of men passing creditably through the univ. course on £100 a year; the *necessary* expenses do not exceed that sum. It appears that some unattached students cover their board, lodging, and tuition for about £45 a year. Discipline inside the college is maintained by the head of the house and the tutors; in the town and its neighborhood, by the proctors, who are univ. officers invested with great authority, which, as a rule, is well exercised. According to the *Universities Commission Report* (1874), the revenue of the colleges and univ. 1871 was £413,000. Chancellor (1889), the Marquis of Salisbury; vice-chancellor, J. Bellamy, D.D. (of St. John's).

The following is a list of the colleges and halls (1889): see these titles also in their alphabetical places—Colleges, etc.: (founded 1249) *University*—head, J. F. Bright, D.D.—undergraduates, 110; (1262) *Balliol*, Benjamin Jowett, M.A., 261; (1270) *Merton*, Hon. G. C. Brodrick, D.C.L., 119; (1314) *Exeter*, W. W. Jackson, M.A., 141; (1326) *Oriel*, D. B. Monro, M.A., 99; (1340) *Queen's*, J. R. Magrath, D.D., 134; (1386) *New*, J. E. Sewell, D.D., 219; (1427) *Lincoln*, W. W. Merry, D.D., 55; (1437) *All-Souls'*, Sir W. R. Anson, D.C.L., 4; (1456) *Magdalen*, T. H. Warren, M.A., 163; (1509) *Brasenose*, C. B. Heberdeen, M.A., 111; (1516) *Corpus*, T. Fowler, D.D., 84; (1532) *Christ-Church*, H. G. Liddell, D.D., 264; (1554) *Trinity*, H. G. Woods, M.A., 145; (1555) *St. John's*, J. Bellamy, D.D., 122; (1571) *Jesus*, H. D. Harper, D.D., 70; (1613) *Wadham*, G. E. Thorley, M.A., 99; (1624) *Pembroke*, Evan Evans, D.D., 64; (1714) *Worcester*, W. Inge, M.A., 119; (1869) *Keble*, Robt. James Wilson, 168; (1874) *Hertford*, H. Boyd, D.D., 88. Halls: (1269) *St. Edmund's*, E. Moore, D.D., 43; (1325) *St. Mary*, D. P. Chase, D.D., 35; (1392) 'Non-collegiate,' and students at private halls, 255—total 2,972. *Charsley's Hall* and *Turrell's Hall*, though private halls, may be counted with the univ. halls, as they hold a license from the vice-chancellor. But the present system of univ. teaching is not very favorable to either the increase or the progress of unattached students. See UNIVERSITY.

See OXFORD: BODLEIAN LIBRARY: RADCLIFFE LIBRARY: also consult Ayliffe's *History of Oxford*, Wood's *Athenæ Oxonienses*, the *University Calendar*, Parker's *Handbook to Oxford* (1875), the *Student's Handbook to the University of Oxford*, and H. C. Maxwell Lyte's *History of Oxford University* (1885).

OXIDE, n. *ŏks'īd* [Gr. *oxus*, sour, acid; *oxos*, vinegar.

F. *oxyde*]: a compound of oxygen with another element, as the rust of iron. OXIDABLE, a. *ŏks'ĭ-dă-bl*, capable of being converted into an oxide. OXIDATE, v. *ŏks'ĭ-dāt*, to convert into an oxide. OX'IDATING, imp. OX'IDATED, pp. OX'IDA'TOR, n. *-dā'tėr*, a contrivance for throwing a current of air on the flame of an argand lamp; also called *oxygenator*. OX'IDA'TION, n. *-shŭn*, the process of converting metals and other substances into oxides; term applied to the union of any body with oxygen, the body being then said to be *oxidized*, and the resulting compound being termed an *oxide*. Many bodies possess the property of entering into several distinct combinations with oxygen—e.g., manganese (Mn) forms no less than five such compounds—viz., MnO, Mn_3O_4, Mn_2O_3, MnO_2, $Mn{\cdot}O_3$, which represent different stages of oxidation. OX'IDIZE, v. *-dīz*, to convert into an oxide; to become an oxide. OX'IDIZING, imp. OX'IDIZED, pp. *-dīzd:* ADJ. converted into an acid by combination with oxygen. OX'IDIZABLE, a. *-dī-zā-bl*, capable of being oxidized. OX'IDIZER, n. *-zėr*, that which oxidizes. METALLIC OXIDES, the most important of all the compounds of the metals, and frequently occurring naturally as abundant and valuable ores. They are divided by chemists into three classes—viz., (1) basic oxides or bases, (2) saline or indifferent oxides, and (3) acid oxides or metallic acids. The different oxides of the same metal usually afford illustrations of two, and frequently of all three, of these classes—e.g., of manganese, the protoxide, MnO, is a powerful base; the red oxide, Mn_3O_4, is a saline or indifferent oxide, showing little tendency to combine with either acids or alkalies; while permanganic acid, $H_2Mn_2O_8$, presents all the properties of an acid. 'As a general rule, the greater the number of atoms of oxygen which an oxide contains, the less is it disposed to unite with the acids; on the contrary, it frequently possesses acid properties, and then unites with bases to form salts. Protoxides generally are strong salifiable bases; they require one equivalent of a monobasic acid to form neutral salts. Sesquioxides are weaker bases; their salts are usually unstable; they require three atoms or equivalents of a monobasic acid to form a salt neutral in composition, though it may not be neutral to test-paper; and, in general, all oxides require as many equivalents of acid as they contain atoms of oxygen in their composition. Some of the metallic acids, like the stannic and titanic, contain two atoms of oxygen to one atom of metal, but most of them contain three atoms of oxygen—e.g., the manganic, ferric, chromic, tungstic, molybdic, and vanadic acids; while in a few cases, such as the arsenic, antimonic, and permanganic, the proportion of oxygen is still higher.'—Miller's *Inorganic Chemistry*, 2d ed., 314. Of the basic oxides, which form by far the most important class, it may be observed that they are devoid of all metallic appearance, and present the characters of earthy matters, and that only six of them are soluble in water to any

considerable extent—viz., the three alkalies, and baryta, strontia, and lime. All the oxides are solid at ordinary temperatures, and, as a general rule, the addition of oxygen to a metal renders it much less fusible and soluble; the protoxide of iron, the sesquioxide of chromium, and molybdic acid being the only oxides that melt more readily than the metal.

OXLEYA, *ŏks'lĭ-a:* genus of trees of nat. order *Cedrelaceæ*, of which one species, *O. xanthoxyla*, the YELLOW WOOD of e. Australia, is a very large tree, 100 ft. high, valuable for timber.

OXLIP: see under OX: see PRIMROSE.

OXON., *ŏks'ŏn:* an abbreviation for Oxonia; sometimes placed by a graduate after his degrees, to indicate that they have been derived from the Univ. of Oxford.

OXONIAN, n. *ŏks-ō'nĭ-ăn:* a student or member of the Univ. of Oxford.

OX'-PECKER (Bird): see BEEF-EATER.

OXTER, n. *ŏks'ter* [AS. *oxtan*, the armpits]: in *Scot.* and also *prov. Eng.*, the armpit.

OXUS, *ŏks'ŭs:* ancient name of a great river in central Asia, called by the Turks and Persians JIHÛN, and AMÛ or AMÛ-DARIA by the natives of the country through which it flows. The O. rises in Lake Sari-kol, in the elevated plateau which separates e. and w. Turkestan; flows through Buddakshan, Bokhara, and Khiva; and empties by several mouths into the Sea of Aral; length about 1,150 m. In the first part of its course, its volume is increased by numerous affluents; but it receives no tributaries after entering Khiva, from which point its course is wholly through a dry sandy desert. The value of the O. for water communication is said by recent Russian geographers to have been much overrated in Europe; and they add that, in summer, vessels of even slight draught could float on the stream only by shutting off the irrigation canals, and risking the desolation of the country dependent on them for its crops. The true value of the O. is its irrigating power for the sterile alluvial wastes through which it runs. Before the Christian era, it is believed that the O. flowed into the Caspian, and that since 600 it has twice changed its course (see ARAL). A great part of the old bed of the O. has recently been explored by M. Stebnutzki (*Bulletin de la Soc. de Géogr. de Paris*, 1871, Apr.), who has ascertained that it has a fall toward the Caspian, from which he infers that its course was changed, not by an upheaval of the Turcoman desert, but by the simple accidents of fluvial action on an alluvial soil.—See *A Journey to the Source of the Oxus*, by John Wood, with Essay of the Geography of the Oxus Valley by Col. Yale, 1873; *The Road to Merv*, by Sir H. Rawlinson, in Proceedings of the Geog. Soc., 1879.

OXYACID, *ŏks'ĭ-ăs-ĭd,* or Ox'-ACID: an acid that contains oxygen. When Lavoisier, 1789, gave the name oxygen to the *Dephlogisticated Air* discovered, 1774, by Priestley, he believed that the presence of oxygen was essential to the existence of an acid; and this view was supported by the composition of the principal acids then known, e.g., sulphuric, nitric, carbonic, and phosphoric acids. But, by degrees, acids were discovered into which no oxygen entered, but which always contained hydrogen; thence acids were divided into two great classes, *oxyacids* and *hydracids;* oxygen being supposed to be the acidifying principle in the former, and hydrogen in the latter. At the present day, scientific chemists usually restrict the term *acid* to compounds into which hydrogen enters, and the acids are regarded as salts of hydrogen; thus, sulphuric acid, H_2SO_4, and nitric acid, HNO_3, are the sulphate and nitrate of oxide of hydrogen; hydrochloric acid, HCl, is chloride of hydrogen, etc.

OXYCHLORIDE, *ŏks-ĭ-klō'rīd:* chemical compound containing both chlorine and oxygen in combination with some other element or radical. Chloride of lime, $CaOCl_2$, chloride of potash, KCl, oxychloride of lead or Turner's yellow belong to this class.

OXYGEN, n. *ŏks'ĭ-jĕn* [Gr. *oxus,* acid; *gennăō,* I generate or produce]: that elementary gaseous body which gives to air its power of supporting respiration and combustion, and which, by its union with hydrogen, forms water. Ox'YGENATE, v. *-āt,* to cause to combine with oxygen. Ox'YGENATING, imp. Ox'YGENATED, pp. Ox'YGENATION, n. *-ā-shŭn,* the act or process of combining with oxygen. Ox'YGENATOR, n. *-ā-tėr,* the same as OXIDATOR: see under OXIDE. Ox'YGENIZE, v. *-īz,* to unite, or to cause to unite, with oxygen; to convert into an oxide. Ox'YGENIZING, imp. Ox'YGENIZED, pp. *-īzd.* Ox'YGENIZER, n. *-zėr,* that which oxygenizes. Ox'YGENIZABLE, a. *-ză-bl,* that may be oxygenized. OXYGENOUS, a. *ŏks-ĭj'ĕn-ŭs,* pertaining to or obtained from oxygen.

OXYGEN [symbol O, at wt. 16, sp. gr. 1.0535], is a colorless, inodorous, tasteless gas at ordinary temperatures. It liquifies at -296° F. (-182.5° C.), and solidifies at -382° F. (-230° C.). When in the solid and liquid states, it has a bluish tint. It was first liquefied by Pictet, of Geneva, for the first time, in 1877. Oxygen belongs in Group VI. of the elements, as arranged according to the Periodic Law (q.v.). Its chemical affinities for other elementary substances are very powerful; with most of them it is found in combination, or may be made to combine in more than one proportion; with several in 4, 5, or 6 proportions; and there are only two elements (fluorine and bromine) with which it does not enter into any combination. Owing to the intensity with which many of these combinations take place, this gas has the power of supporting Combustion (q.v.) in

an eminent degree. Of all known substances, it exerts the smallest refracting power on the rays of light. It possesses weak but decided magnetic properties, like those of iron, and, like this substance, its susceptibility to magnetization is diminished or even suspended by a certain elevation of temperature. It is only slightly soluble in water; 100 cubic inches of that liquid dissolving 4·89 cubic inches of gas at 32°, and only 2·99 inches at 59°.

Oxygen gas is not only respirable, but is essential to the support of animal life; hence it was termed *vital air* by some of the older chemists. A small animal placed in a bell-glass containing pure oxygen will not be suffocated so soon as if it were placed in the same glass filled with atmospheric air. For further details on this property of oxygen, see RESPIRATION. Oxygen is the most abundant and most widely distributed of all the elements. In its free state (*mixed* but not *combined* with nitrogen), it constitutes about a fifth of the bulk, and considerably more than a fifth of the weight, of the atmosphere. It forms eight-ninths of all the water on the globe, hydrogen forming the remaining ninth, the two gases being chemically combined; and in combination with silicon, calcium, aluminium, etc., it enters largely into all the solid constituents of the earth's crust; silica in its various forms of sand, common quartz, flint, etc.—chalk, limestone, and marble—and all the varieties of clay, containing about half their weight of oxygen. It is, moreover, found in the tissues and fluids of all forms of animal and vegetable organisms, none of which can support life independently of this element.

There are various modes of obtaining oxygen, the simplest of which consists in the exposure of certain metallic oxides to a high temperature. It was originally obtained by its discoverer, Dr. Priestley, from the red oxide of mercury, which, when heated to about 750°, resolves itself into metallic mercury and oxygen gas. It may be obtained similarly from red oxide and peroxide of lead, the resulting products in these cases being protoxide of lead and oxygen. It is also obtained by the electrolysis of water, the oxygen going to the positive electrode. The following are the chief methods now employed: (1) The black oxide (or dioxide) of manganese, MnO_2, is much employed as a source of this gas. The mineral is reduced to small pieces about the size of a pea, and introduced into an iron bottle, with a pipe through which the gas may escape. When the bottle is placed in a furnace, and attains a red heat, the mineral parts with one-third of its oxygen, and the red oxide of manganese, $MnO \cdot Mn_2O_3$, remains behind, the reaction being explained by the equation:

Black Oxide of Manganese.		Red Oxide of Manganese.		Oxygen.
$3MnO_2$	=	$MnO \cdot Mn_2O_3$	+	$2O$

(2) A more convenient method is by decomposition of chlorate of potash by heat. That salt, when heated

alone, yields pure oxygen gas, the residue being potassium chloride:

$$2KClO_3 = 2KCl + 3O_2.$$

When it is not essential that the oxygen obtained shall be quite pure, the chlorate of potash is mixed with about $^1/_{10}$ its weight of dry peroxide of manganese. When this mixture is heated, the oxygen is disengaged very rapidly. (3) Various processes have been proposed for obtaining the gas on a large scale. The only one that has assumed commercial importance is the following, invented by M. M. Brin: Atmospheric air, freed from moisture and carbonic acid, is passed through retorts containing heated anhydrous oxide of barium, free from carbonates and nitrates. Here the oxygen is absorbed, while the nitrogen passes to a receiver. When the baryta can absorb no more oxygen, the retorts are disconnected with the air supply and the nitrogen-receiver, and are connected with the oxygen-holder. Increased heat is now applied to the retorts, and a partial vacuum produced in the oxygen-holder. This causes liberation of the absorbed oxygen, leaving the baryta ready for a repetition of the process. For the compounds of oxygen, see the titles of the other chemical elements.

Oxygen was discovered almost simultaneously, 1774, by Priestley and by Scheele, the English chemist having precedence by a few weeks. Priestley gave it the name of *Dephlogisticated Air;* Scheele termed it *Empyreal Air;* Condorcet shortly afterward suggested *Vital Air,* as its most appropriate designation; and 1789, Lavoisier—who, by a series of carefully conducted and very ingenious experiments, proved that the combustion of bodies in the air consisted essentially in their chemical combination with oxygen, and thus overthrew the *Phlogiston* (q.v.) theory—gave it the name which it now retains, in consequence of his (erroneously) believing that its presence was necessary to the existence of an acid (see OXYACID).

Oxygen is used as an oxidizing and bleaching agent in various manufacturing processes: it is used in the manufacture of vinegar and for maturing spirits; it is used with hydrogen (q.v.) or illuminating gas (q.v.) to produce the oxy-hydrogen flame; it is used to maintain the air in a respirable condition in submarine vessels and diving bells. It is very largely used in medicine, especially in the treatment of pneumonia and other pulmonary affections, and in cases of obstructed respiration, asphyxia from inhaling charcoal fumes, etc. It is largely used in dentistry and surgery in connection with anesthetics, to lessen the danger and to prolong the anesthesia.

OXYHYDROGEN BLOW'PIPE, *ŏks-ĭ-hī'drō-jĕn:* instrument for producing an intensely hot flame by burning in combination the two gases hydrogen and oxygen. The most efficient form of the O. B. is, no doubt, that invented by Newman—a strong copper reservoir and a glass tube or nozzle about 4 in. long and $^1/_{80}$-in. bore. In

the reservoir was held, under 2 to 3 atmospheres' pressure, a mixture of the two gases in the proportion of 2 volumes of hydrogen to one of oxygen. The gases were ignited on issuing from the nozzle. To increase the volume of the flame, Newman substituted a $^1/_{60}$-in. nozzle in place of the $^1/_{80}$-in.; but the flame travelled back and exploded the gases in the reservoir. The result led to the disuse of Newman's apparatus, and the general adoption of Hare's O. B. In this, the hydrogen (or coal gas) streams out of the annular space between two coaxial tubes, while oxygen is being blown into the hydrogen flame through the central tube. The calorific effect is second only to that of the electric arc: even silica and alumina (absolutely infusible in any furnace) run into viscid glasses under the oxyhydrogen blowpipe.

OXYHY'DROGEN LIGHT. See DRUMMOND LIGHT.

OXYHY'DROGEN MI'CROSCOPE. See SOLAR MICROSCOPE.

OXYMEL, n. *ŏks'ĭ-mĕl* [Gr. *oxus*, acid; *meli*, honey]: a mixture of vinegar and honey.

OXYMORON, n. *ŏks'ĭ-mō'rŏn* [Gr. *oxus*, acid, sharp; *mōros*, dull, stupid]: a figure of speech in which an epithet of quite an opposite signification is added to a word, as a wooden milestone, a cruel kindness.

OXYOPIA, n. *ŏks'ĭ-ō'pĭ-ă* [Gr. *oxus*, acid, sharp; *ōps*, the eye, *ōpos*, of the eye]: preternaturally acute vision.

OXYPHONE, n. *ŏks-ĭf'ŏ-nĕ* [Gr. *oxus*, acid, sharp; *phōnē*, the voice]: acuteness or shrillness of voice.

OXYRHYNCHUS, *ŏks-ĭ-rĭng'kŭs:* celebrated Egyptian fish, said to be reverenced throughout Egypt, and sacred to the goddess Athor. Its name in Egyptian is *kha*, and the fish in the hieroglyphs was used for this syllable, and expressed particularly the idea of the body. In the ritual, the deceased stated definitely that he had not caught this fish. The name appears to have comprised the genus *Mormorus*, distinguished by its pointed nose and long dorsal fin. The fish was worshipped in one of the nomes, which was called after it, and the inhabitants held it in such reverence that they would not touch any fish captured by a hook. When the portions of the body of Osiris were flung into the Nile, this fish alone ate one portion of his body. The oxyrhynchus was not eaten in Egypt, except by the natives of the Cynonopolites Nomos. Its modern name is *Mizeleh*, which seems retained in the Coptic Pemge, the name of the city of Oxyrhynchus. It is represented both in the sculptures and on the coins of the Nome, and was anciently embalmed.

OXYRHYNCHUS: ancient name of a town in Egypt, now known as Belmesa. It is at present nothing but a heap of mounds, which cover an area surpassed by few ancient Egyptian towns. These mounds have recently been opened and explored and have yielded rich finds in

papyri, containing many precious treasures of lost classical and early Christian literature. The Greek papyri unearthed in 1903 include a 3d century fragment of the so-called 'logia' or *Sayings of Jesus,* such as were discovered in the same place in 1897. Among the Latin papyri is a fragment of the epitome of Livy's history covering Books 37-39 and 49-55. On the back of this papyrus is written the largest piece of the New Testament on papyrus yet discovered, namely, the Epistle to the Hebrews. Another fragment comes from the Septuagint version of Genesis—a century older than extant vellum manuscripts of the same book. Among other Greek papyri is a 1st century B.C. copy of an epinician ode, by a poetess, perhaps Corinna, the rival and reputed teacher of Pindar; epigrams by Leonidas, Antipater, and Amyntas; part of a philosophical dialogue in which the tyrant Pisistratus is one of the speakers; a long 2d century papyrus contained an invocation to a goddess, and on the back an account of a miraculous cure effected by Imhotep, the Asclepius of the Greeks, and the Æsculapius of the Romans.

OXYSALT, n. *ŏks'ĭ-sawlt* [*oxygen,* and *salt*]: a salt into the composition of which oxygen enters.

OXYTONE, a. *ŏks'ĭ-tōn* [Gr. *oxus,* acid, sharp; *tonos,* a tone]: having an acute sound; in *Gr. gram.,* having the accent on the last syllable: N. an acute sound.

OXYURICIDE, *ŏk-sĭ-ū'rĭ-sīd* [Gr. *oxyuris,* pinworm; suffix *-cide*]: medicine intended to destroy pinworms.

OXYURIS VERMICULARIS, *ŏks-ĭ-ū'rĭs vėr-mĭk'ū-lėr-ĭs:* an intestinal worm known also as *Ascaris vermicularis.* It is known also as the Thread-worm or Maw-worm, and is very common both in children and in adults. It infests chiefly the lower part of the intestines, and particularly the rectum, great numbers being often present together, and occasioning intolerable itching, irritation, and loss of sleep, although there is not in general much serious injury to health. The same anthelmintics employed against other intestinal worms are found efficacious also in the expulsion of this; and olysters, an infusion of quassia, are often employed with great success. The thread-worm is white, not more than half an inch in length, the male much less.

It has been recently discovered that its nervous system is very highly developed, consisting of many ganglia, with connecting and ramifying cords. For the mode of recognizing the presence of this worm, and treating patients suffering from it, see VERMIFUGES; WORMS.

OXYUS, *ŏk'sĭ-ŭs* [from Gr. *oxus,* sharp]: in sponges, a spindle-shaped spicule, such as occurs in the genus *Spongilla.*

OYAMA, IWAO, *ō'yâ-mâ ī'wâ-ō,* MARQUIS: Japanese marshal: b. Satsuma 1842. From his youth he was trained to the profession of arms. He fought with the Imperial forces against the Shogun during the War of

the Restoration. During the Franco-Prussian War in 1870, he was dispatched to the seat of the struggle as attaché to the Prussian army. In the following year he was appointed major-general and sent to France for study, staying there three years. He was acting minister of war and commander of the Tokyo garrison in 1877 when civil war broke out in Satsuma. Commanding a brigade, Oyama fought most bravely against the rebels and succeeded in raising the siege of Kumamoto Castle which was entirely surrounded by the insurgent forces. This was the most important event during the whole course of the war and in return he was promoted to the rank of lieutenant-general and appointed assistant-chief of the general staff in the following year. In 1880 Oyama was intrusted with the important post of war minister, being transferred two years later to the head of the general staff. In 1884 he was again ordered to Europe for the purpose of investigating the military system in Occidental countries. During his stay abroad he was created count. His return home in the following year was signalized by the beginning of the military reforms in Japan, which brought her army to its present state of efficiency. He was again appointed minister of war towards the end of the same year, and made full general in 1891. General Oyama was at the head of the war office when the Chinese War broke out. He was soon ordered to the front as commander-in-chief of the second army, which captured Port Arthur and Wei-hai-wei. On the termination of hostilities he was promoted to the Marquisite in reward of his services. In 1898 he was made marshal and again installed in the office of chief of the general staff, which he held till the outbreak of the Russo-Japanese War (q.v.), when he was appointed commander-in-chief of the Manchurian army and at once proceeded to the front. He led the army in an unbroken series of victories, crushing the military power of Russia in the Far East.

OYER, n. *ō'yėr* [Norm. F. *oyer;* F. *ouir;* OF. *oir*, to hear—from L. *audīrĕ*, to hear]: hearing or trial of causes in law, particularly in case of a claim or a defense by a deed, when it is said of the opposite party that he has a right to have oyer (i.e., hearing) of the deed as read in court. Oyer was abolished in England 1852; and is practically disused in the United States—other forms of process being employed for securing production of instruments in court. OYER AND TERMINER, *tėr'mĭn-ėr* [F. to hear and determine]: court constituted, in England by a commission, in the United States by statute, to hear and determine criminal causes.

OYEZ, or OYES, int. *ō-yĕs'* [Norm. F. *oyez*, hear ye, imp. of *oyer*, to hear]: the introductory cry of an official connected with a court of law, or of any public crier, requiring silence or attention, which is thrice repeated.

OYLET, n. *oy'lĕt* [F. *œillet*, a little eye]: an eyelet; a scar resembling an eyelet-hole.

OYSTER, n. *oys'tėr* [OF. *oistre;* Icel. *ostra;* AS. *ostre;* Ger. *auster*, oyster—from L. *ostrĕă;* Gr. *ostrĕŏn*, an oyster]: bivalve shell-fish, much esteemed for food (see below). OYS'TERLING, n. little oyster. OYSTER-BED, breeding-place for oysters; a bank in a tidal river, or other water on or near the sea, where oysters are fattened for sale. OYSTER-PATTY, a pasty with oysters baked.

OYSTER, *oys'tėr* (*Ostrea*): genus of lamellibranchiate mollusks, of the section with a single adductor muscle: see LAMELLIBRANCHIATE. The shell consists of two unequal and somewhat irregularly shaped valves, of laminated and coarsely foliated structure; and the hinge is without tooth or ridge, the valves being held together by a ligament lodged in a little cavity in each. The animal is, in its organization, among the lowest and simplest of lamellibranchiate mollusks. It has no *foot;* and, except when very young, no power of locomotion, or organ of any kind adapted to that purpose. Its food consists of animalcules; also of minute vegetable particles, brought to it by the water, a continual current of which is directed toward the mouth by the action of the gills. The gills are seen in four rows when the valves of the shell are separated, a little within the fringed edge of the mantle. In the most central part is the adductor muscle; toward the hinge is the liver, which is large; and between the adductor muscle and the liver is the heart, which may be recognized by the brown color of its auricle. The mouth—for, as in the other lamellibranchiata, there is no head—is situated beneath a kind of hood, formed by the union of the two edges of the mantle, near the hinge. It is jawless and toothless. The ovaries are very large during the season of reproduction, which extends over certain months in summer, when oysters are out of season for the table: these months are familiarly said to be the four whose names are without the letter *r*—May, June, July, August. Oysters are hermaphrodite; or, rather, as the researches of Hoek have shown, there occurs in the same individual an alteration of sex. They begin to spawn when about a year old, and produce vast numbers of young. Leeuwenhoek calculated that 3,000 to 4,000 exist within an O. at once when 'sick,' 'milky,' or full of spawn; and, according to Poli, one O. produces about 1,200,000 eggs. The eggs of the European species are hatched within the shell and mantle of the parent, and the young are seen swimming slowly in a whitish and mucous or creamy fluid surrounding the gills, which becomes darker and of muddy appearance when they are about to be expelled. Each young O. is then about $\frac{1}{120}$ of an inch in length, and about two millions are capable of being packed in the space of a cubic inch. When the parent O. expels the young, and this is done simultaneously by multitudes on an oyster-bank, the water becomes filled as with a thick cloud, and the spawn—called *spat* by fishermen—is wafted away by currents: the greater part, of course, to be generally

lost, by being driven to unsuitable situations, as exposed rocks, muddy ground, or sand to which it cannot adhere, or to be devoured by fishes and other marine animals; but some to find an object to which it can attach itself for life. The young come forth furnished with a temporary organ for swimming, ciliated, and provided with powerful muscles for extending it beyond the valves and withdrawing it at pleasure; and when the O. has become fixed in its permanent place of abode, this organ, being no longer of any use, has been supposed to drop off, or gradually to dwindle away and disappear. Frank Buckland several years ago expressed the opinion that the swimming organ of the young O. is the 'lungs,' and

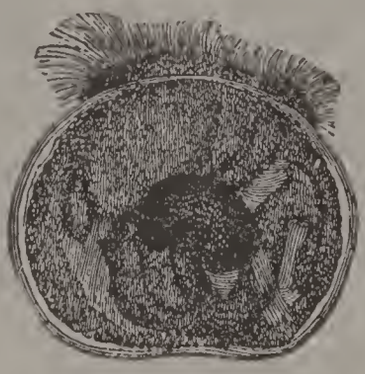


Fig. 1.

Fig. 2.

remains as the 'lungs' in the mature O. The four figures here represent the young O. much magnified. Figs. 1, 3, 4, are views of the upper and under side; fig. 2 is an edge view. In very favorable situations, oysters grow rapidly, so that the Common O. is ready for the table in

Fig. 3.

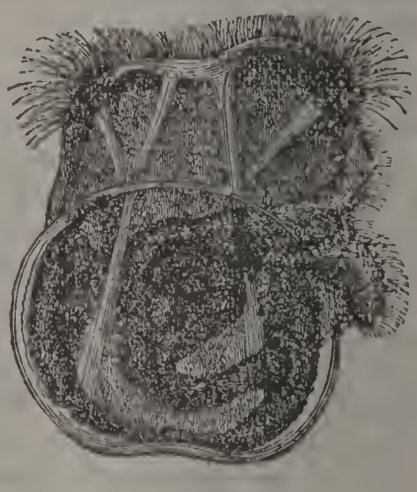


Fig. 4.

a year and a half or two years; but in other places, a longer time is required, often about five years.

It has been said that in the American species the eggs are hatched not within the parent shell, but in the water outside, where the fertilization takes place with the mingling of the spawn discharged from the male and

female. The fact is, rather, that in the American oyster there is no period of incubation within the mantle-cavity of the parent. The spawning season in Europe is May-Sep.; in the U. S., Apr.-Oct. The American oyster is exceedingly prolific, producing 10,000,000 and even as many as 60,000,000 young—from 5 to 30 times as many as the European oyster, but this advantage is much more than counterbalanced by the much smaller number of the young of the American oyster that pass safely through the perils incident to the early stages of the oyster's life. The European oyster takes some little care of its young, keeping them for several days within the folds of the mantle; but in the case of the American oyster, fertilization takes place in the water, and the embryotic oysters are from the first moment of their existence exposed to innumerable dangers. The growth of the American Oyster is much more rapid than that of the European. When 2 weeks old, it is of the size of a pin-head; after 3 months it is as large as a pea; then the rate of growth is accelerated, and after the sixth month the young oyster is an inch long. It is ready for market after 3 years. The average age of the American oyster is 10 years; but some have been known to live 30 years. Old oysters sometimes attain great size —3 ft. long by 2 ft. broad.

The species of oyster are numerous (70 have been distinguished), and are found in the seas of all warm and temperate climates. None have been found in the coldest parts of the world. The COMMON OYSTER (*O. edulis*) is the European species. Like it, the other species are generally found where the water is of no great depth; and some of them, also like it, are very abundant in estuaries, where the water is not very salt. Yet oysters do not thrive in water with less than three per cent. of salt, e.g., in the Baltic. The mangrove swamps of warm climates often abound in oysters of excellent flavor (*O. parasitica,* etc.), adhering to the roots and branches of the trees, within the reach of the tide. Some of the species differ from the Common Oyster not a little in form, as the LONG-HINGED OYSTER (*O. Canadensis*) of N. America, which is very elongated; and some of them far exceed it in size. Sir J. E. Tennant states that he measured the shell of an edible oyster in Ceylon, and found it a little more than 11 inches in length by half as many in breadth; 'thus unexpectedly attesting the correctness of one of the stories related by the historians of Alexander's expedition, that in India they had found oysters a foot long.' Some species of oyster have the valves plaited with strong longitudinal plaits. The American oyster closely resembles the European. According to the latest statistics the annual production of oysters in the United States is about 28,150,000 bushels, valued at about $14,325,000. The most abundant supplies are from Chesapeake and Delaware Bays, the N. J. coast, and Long Island Sound. The American oyster is much larger

than the European, and lacks the coppery taste of the latter.

Young oysters readily attach themselves to the shells of old ones, and thus, in favorable circumstances, oyster-banks increase rapidly, so as to fill up shallow parts of the sea, and to form walls which effectually resist the waves and tide. This is remarkably the case on the alluvial shores of Ga. and some other parts of N. America, where these banks are called *Raccoon Banks*, because the raccoon, among other animals, visits them to feed upon the oysters. Marshy land extends inward 12 to 18 m. from the sea, with tidal rivers meandering through it; and these rivers are kept to their channels by the walls of living oysters on both sides. Large bunches of oysters may even be found among the long grass. It is not unusual for the inhabitants to light a fire and roast a bunch of oysters on the spot. So abundant are the oysters in many places, that a vessel of 100 tons might be loaded within three times her own length. American oysters, which are of excellent flavor, have for years been exported (alive) into Britain, to the value of hundreds of thousands of dollars a year.

Notwithstanding the prodigious fecundity of the O., however, the beds or banks which yield it for the markets of European countries are not sufficiently productive to satisfy the demand; and in Europe it is not so much an article of ordinary food for all classes, as a luxury of the wealthy. The usual mode of taking oysters by dredging is destructive, though, for oyster-beds, which are at all states of the tide covered with a considerable depth of water, nothing better has been devised; and the anxiety of fishermen to make the most of the present opportunity has caused many beds to be almost ruined by overdredging. But the artificial formation of oyster-beds has been successful. In the United States there is much replanting, at the north and on the Pacific coast, of oysters taken from Chesapeake Bay. Oyster-culture is indeed no novelty, having been practiced by the Romans. Among the *vivaria* of later emperors and other wealthy Romans were *ostrearia*, specially for oysters; and oyster-culture has never ceased to be practiced in Italy, though to an inconsiderable extent, and particularly in the Lake of Fusaro (q.v.), the Acheron of Virgil, a muddy salt-water pond, nowhere more than 6 ft. deep.

The English plan of oyster-culture as practiced at Herne Bay, Reculver, Whitstable, Langston Harbor, Isle of Wight, etc., depends on the provision of salt-water tanks or ponds, in which the oysters are kept for a time. In France, the system is much more elaborate. The coast is parted into divisions or districts, each placed under a maritime prefect, and divided and subdivided into smaller portions, managed by commissioners, inspectors, syndics, and watchmen. The determination of 'close-time,' when oyster-fishing is totally prohibited; the decision how much to fish up, and how

much to reserve for restocking; the discrimination between public oyster-beds and those made over to individuals by 'concessions;' the control of the fore-shore; the maintenance of oyster-breeding farms; the prevention of poaching by fishers not belonging to the respective districts—occupy quite an army of officials. In 1872, the enhanced price of oysters in France attracted much public attention. Close observers arrived at an opinion that it was due to three causes—impoverishment of some of the beds by injudicious dredging; greatly increased demand for the supply of Germany and Russia; and a private understanding between many of the French companies, leading to something very like a monopoly. The price per 100 was 1·20 francs in 1840, 2·83 francs in 1856, 4·58 francs in 1860, 7·20 francs in 1868, and 11·20 francs in 1872. For consumption and further development, about 380,000,000 oysters were taken 1881 from the basin of Arcachon, where the govt. has preserved banks, and the beds of Marennes and Concarneau; while, 1880, from 21 places where this industry is carried on, about 195,000,000 were sent to market.

Oyster-culture is receiving much attention in Australia. Oyster-farms were established in New South Wales and in Victoria 1872.

Oysters live equally well in situations where they are constantly under water, and in those left dry by the retiring tide. In 1882, a discovery was made of 10,000 acres of oyster-beds in the North Sea, 20 fathoms deep, extending over a length of 200 m., and a breadth of 60 or 70—unhappily not easily dredged. Where ebb-tide leaves oysters dry, they instinctively keep their valves closed when the water deserts them. In such situations oyster-culture is most easily carried on. Various methods are adopted of preparing the artificial oyster-bed, by providing suitable solid objects for the oysters to attach themselves to. Stones are piled together, and in such a way that there are many open spaces among them; stakes are driven into the mud or sand; bundles of small sticks are fastened to stones or stakes; floors of planks are formed, at a little height above the bottom, with alleys between them, the under surface of the planks being roughened by the adze; and tiles are arranged in various ways, so as to turn to account the whole space at the disposal of the oyster-cultivator as high as the ordinary tides reach. The method must be varied in accordance with the situation, and the probable violence of winds and waves; but sheltered situations are best in all respects; and experience in France seems to prove that tiles covered with cement are preferable to everything else yet tried, as convenient for the cultivator, presenting a surface to which oysters readily attach themselves, and from which they can easily be removed, while the larger seaweeds do not grow on it so readily as on stones or wood. By the use of tiles covered with cement, the cultivtaor is also enabled easily to remove young oysters from breeding-

grounds to feeding-grounds; the best breeding-grounds being not those in which the oyster most rapidly attains its greatest size, and gains that greenish tinge which Parisian epicures desire to see, due to the abundant confervæ and green monads of quiet, muddy waters.—It has been long known that the oysters of particular localities are finer than those produced elsewhere. Those of Rutupiceæ, now Richborough, in Kent, England, were highly esteemed by the Romans, whose epicurism in oysters exceeded that of modern nations.

Raw oysters are generally believed to be more nutritious and more easily digested, as to many they are more delicious, than oysters cooked in any way; and it does not appear that any such evil consequences ever ensue from eating them as are known to ensue from eating other kinds of uncooked food. Probably no parasite capable of developing into any form injurious to the human being exists in the oyster.

The genus *Ostrea* gives its name in some zoological systems to a family *Ostreadæ*. The fossil species are more numerous than the recent. The name O. is popularly extended to many mollusks not included among the *Ostreadæ*, as the Pearl Oyster (q.v.). Oysters raised in artificial beds are called 'natives,' and are considered much superior to those dredged from the natural beds; though to these last the name of 'native' would seem more appropriate than to the other.

Fossil Oysters.—A single species occurs in the Carboniferous Limestone; and as we rise in the crust of the earth, the genus becomes more and more common, no less than 200 species having been recorded, many scarcely distinguishable from the living species. The sub-genus Gryphæa was a free shell, with a large thick left valve and small concave right valve; 30 species have been found in beds of the Oolite and Chalk periods. In the same beds occurs another form of Ostrea, with sub-spiral reversed umbones, to which the sub-generic name Exogyra has been given: 40 species of this form have been described.

Law as to Oysters.—The rule is, that he who has the right of property in the soil or sea-shore is entitled to catch or keep and breed oysters there. But the shore below the medium line of the tides in Britain belongs to the crown, and not to any individual; and in the United States all below low-water mark is under control of the state govt.; and such govts. have power to pass laws restricting the taking of oysters there. In Britain it is only by virtue of some grant from the crown that an individual or a corporation can establish an exclusive title to the sea-shore, and in such a case is exclusively entitled to any oyster-beds there. The laws of some states in the Amer. Union (notably Conn.) provide that any person may acquire an interest in a number of acres of land under water, as an oyster-bed, on conforming to the requirements of the statute in relation to staking, giving notice, etc. In such cases the state can confer an exclu,

sive right of ownership; and to take oysters in disregard of such right is larceny. In most of the states the principle prevails that the oyster-beds, with the bottoms of rivers, harbors, etc., are inalienable common property, which the state can only guard and protect for public use, but cannot sell. It has been decided that it is not unconstitutional for a state to make laws restricting the taking of oysters from its shores by citizens of other states. Except in Conn. fishing by steam-vessels is forbidden, also fishing by night, and fishing during the three summer months.—See Lieut. Francis Winslow, in a catalogue of the Economic Mollusca exhibited by the U. S. National Museum at International Fisheries Exhibition, London, 1883.

OYS'TER BAY: town on the n. shore of Long Island, N. Y., on a deep sheltered bay, opening into Long Island Sound, 25 m. n.e. of New York. It has long been a favorite place of summer residence, is an attractive watering-place, and is the home of President Roosevelt. Pop. (1890) 13,870; (1900) 16,334.

OYS'TER CATCHER (*Hæmatopus*): genus of birds of family *Charadriadæ* (q.v.), chiefly inhabiting seacoasts, where they feed on mollusks, crustaceans, annelids, and other marine animals—sometimes even on small fishes. Their legs are of moderate length, like those of the plovers, and, like them, they have no hind-toe. The most remarkable generic distinction is found in the bill, which is long, strong, straight, much compressed and wedge-like toward the point. They are generally said to make use of the bill for opening the shells of oysters and other mollusks; but some naturalists have expressed reasonable doubt on this point. The habits of the only European species (*H. ostralegus*), so far as they have been accurately observed, agree with those of the American. It is common on all parts of

Oyster-catcher (*Hæmatopus ostralegus*).

the British coasts, on those of continental Europe, n. Africa, and n. Asia. Its whole length is about 16 inches. Its finely-contrasted black and white colors have gained

it the name of SEA PIE. It is most abundant on the sea-coast, but often visits inland regions, and sometimes breeds in them. It does not make a nest, but lays its eggs—usually four—on the shingly beach or bare ground. On some sandy flat coasts, the eggs are found in great numbers. The American O., *H. palliatus*, is a bird of passage, deserting the n. regions in winter. It is rather larger than the European species, and differs from it in colors, and in greater length and slenderness of bill.

OYS'TER GREEN: sea-weed, otherwise called SEA-LETTUCE (*Ulva lactuca*), because it is of lettuce-green color, and adheres to oyster-shells. The same name is given to *Ulva latissima* (green laver), and both species are common on the Atlantic coast of N. America. *U. lactuca* is used sometimes medicinally, in combination with lime-juice, in the treatment or for prevention of scrofula. The ancients prescribed it in gout and rheumatism. Its taste is very bitter. *U. latissima* is sometimes eaten as food, but is far excelled by species of an allied genus, *Porphyra* (*P. vulgaris*, *P. laciniata*). O. G. is valuable for the salt-water aquarium, because it thrives in still water.

OYS'TER PLANT: see SALSIFY.

O'ZAKA: see OSACA.

OZANAM, *o-zâ-nŏng'*, ANTOINE FRÉDÉRIC: French critic: 1813, Apr. 25—1853, Sep. 8; b. Milan, Italy; of an ancient and distinguished Jewish family. He was educated at Lyons, and when only 18 years of age published a pamphlet, *Reflexions Sur la Doctrine de Saint Simon*, which attracted wide attention. He went to Paris 1832 to study law; made the acquaintance of Chateaubriand, Ampère, and other noted men, joined the Neo-Catholic movement, and with 7 other students founded 1833 the benevolent and religious organization afterward known as the Society de Saint Vincent de Paul. He was prof. of commercial law in Lyons 1839, the following year became assistant to Fauriel at the Sorbonne, and on the death of Fauriel 1844 succeeded him as prof. of foreign literature. He was a hard worker, a profound scholar, and a popular teacher. He was devotedly attached to the Rom. Cath. Church, and was almost universally respected and beloved. His complete works (11 vols.) appeared in Paris 1862–75, and his *Life* has been published by both German and English authors. Among his principal works are *Dante et la Philosophie Catholique; Études Germaniques; and Les Poëtes Franciscains*. He died at Marseilles.

OZARK, *ō-zârk'*, MOUNTAINS: irregular range of mountains extending from southern Mo. through the n.w. portion of Ark. to the Red river region of the Indian Territory. The elevation does not usually exceed 1,500 ft., but sometimes reaches 2,000 ft. They contain great quantities of iron, and probably of other minerals, are covered with valuable timber, and are noted for beautiful scenery.

OZENA, or OZÆNA, n. *ō-zē′nă* [L. *ozæna*; Gr. *ozaina*, an offensive ulcer in the nose—from Gr. *ozē*, a stench]: discharge of fetid, purulent, or sanious matter from the nostrils. It is a symptom rather than a disease, and may arise from ulceration of the membrane lining the nostrils, or from caries of the adjacent bones; and may accompany syphilitic, scorbutic, scrofulous, or cancerous affections of these or adjacent parts. A slighter form of O. sometimes follows chronic coryza (or cold in the head), malignant scarlatina, and erysipelas of the face. The discharge is seldom accompanied by acute pain, unless when caused by cancer; sometimes, however, aching is complained of. The prognosis must depend on the nature of the disease causing the discharge. The treatment may be divided into the general or constitutional, and the local. *General treatment* should consist of tonics combined with alteratives, e.g., preparations of bark with the alkalies or with the mineral acids; dry, bracing air, or temporary sojourn at the sea-side, also is usually of service. *Local treatment* consists in inhalation, once or twice a day, of the steam of boiling water, to which a little creosote or carbolic acid has been added; and in more severe cases, in the thorough syringing of the nostrils, to wash away all collections of matter with a copious stream of warm water to which a little chloride of zinc has been added (about 30 minims of Burnett's solution to half a pint of water).

OZIERI, *ō-tsē-ā′rē:* town of the island of Sardinia, province of Sassari, 26 m. e.s.e. from Sassari, among the mountains which occupy the centre of the island. It stands in a deep valley, open only to the n., therefore peculiarly exposed to cold winds.

OZOCERITE, n. *ō-zo-sē′rīt*, or OZOKERITE, n. *ŏz-ŏ′kėr-īt* [Gr. *ozō*, I smell; *kēros*, wax]: one of the mineral resins or fatty matters occurring in shales of the Coal formation; a mineral wax of a rich brown with a green tint, found in immense deposits in Galicia and Moldavia, which is refined and made into candles.

OZONE, n. *ō′zōn* [Gr. *ozō*, I smell; *ozōn*, smelling]: allotropic modification of oxygen, involving contraction of volume, and acquisition of new properties, with great enhancement of energy. OZONIZED, a. *ō′zŏn-īzd*, charged with or containing ozone. OZONOMETER, n. *ō′zŏn-ŏm′ĕ-tėr* [Gr. *metron*, a measure]: test employed to detect the presence of ozone in the atmosphere, and the relative quantity contained in it.—*Ozone* has a peculiar odor. This odor was long ago remarked as produced by the working of an electrical machine. Van Marum found that, when electric sparks were passed through a tube containing oxygen, the gas became powerfully impregnated with this odor—which he therefore called the 'smell of electricity.' Subsequent writers attributed the phenomenon to the formation of nitric acid, due to a trace of nitrogen mixed with the oxygen; especially as the gas was found to act energetically on mercury. Thus supposed to be explained, these curious results were soon forgotten. But in 1840, Schönbein (q.v.) made closer investigation and arrived at many curious results, not all even yet satisfactorily accounted for.

The earlier results of Schönbein were as follows: (1) When water is decomposed by the voltaic current, the electrodes being of gold or platinum, the oxygen (which appears at the positive pole) possesses in a high degree the smell and the oxidizing power developed by Van Marum by means of friction-electricity. (2) When the positive electrode is formed of an oxidizable metal, these results are not observed, but the electrode is rapidly oxodized. (3) The oxygen collected at a platinum electrode retains these properties for an indefinite period, if kept in a closed vessel; but loses them by heating, by the contact of an oxidizable substance, and even by contact with such bodies as charcoal and oxide of manganese. To the substance, whatever it may be, which possesses such powerful chemical affinities, Schönbein gave the name ozone, from its peculiar smell. In 1845 he showed that the same substance can be produced by the action of phosphorus on moist air; and suggested that it might be a higher oxide of hydrogen. De la Rive and Marignac shortly afterward, repeating the experiments of Van Marum, showed that electric sparks produce O. even in *pure* and *dry* oxygen; and came to the conclusion, that O. is oxygen in an *allotropic* state, as diamond is a form of coke or charcoal. Baumert, 1853, endeavored to show that there are two kinds of O.—one formed from pure oxygen by electric sparks, which he allowed to be allotropic oxygen; the other formed in the voltaic decomposition of water, which he endeavored to prove to be a *teroxide* of hydrogen (HO_3). But Andrews, 1856, completely refuted this, by showing that no such oxide of hydrogen (at least in gaseous form) is produced in the electrolysis of water; and that O. from whatever source obtained, is the same body; and is not a compound, but an allotropic form of oxygen. In 1860 Andrews and Tait published the results of a

series of *volumetric* experiments on this subject, which led to remarkable conclusions—among which are the following: When the electric discharge is passed through pure oxygen, that gas *contracts*. If O. be oxygen in an allotropic form, it must therefore be denser than oxygen. It was found also that a much greater amount of contraction, and a correspondingly greater quantity of O., were produced by a silent discharge of electricity between fine points, than by a brilliant series of sparks. The contraction due to the formation of the O. is entirely removed by the destruction of the O. by heat: and this process can be repeated indefinitely on the same portion of oxygen. In attempting to determine the density of O., they used various bodies to take up the O. from the oxygen containing it; and met with many very curious results. Thus, if mercury be introduced, it is immediately attacked and oxidized, yet the oxygen *increases* in volume. If iodine be employed, it is immediately oxidized, and *no change* of volume is observed: in the researches of Andrews and Tait none was observed, though the apparatus would have at once rendered visible a change to the amount of $\frac{1}{6000}$ of the bulk of the oxygen.

Owing to the impossibility of obtaining O. apart from a relatively large volume of unchanged oxygen, it was many years before the exact relation of O. to common oxygen was determined. It was, however, finally shown, on the basis of experiments made by Soret, 1865–67, and especially as the result of elaborate study by Sir B. Brodie, 1872, that 2 volumes of O. consist of the same matter as 3 volumes of ordinary oxygen, and hence that the molecule of O. must be expressed by the formula O_3 when that of oxygen is O_2.

O. is easily prepared by subjecting ordinary oxygen to the action of the silent electric discharge. For this purpose a stream of oxygen is passed through a tube into which is sealed a pair of very finely-pointed platinum wires with their points at a little distance apart, one being connected with an electrical machine, and the other with the ground. No sparks must be allowed to pass, as in that case a considerable portion of the O. would be reconverted into ordinary oxygen.

O. is insoluble in water and in solution of acids or alkalies. Air charged with it exerts an irritating action in the lungs. O. is decomposed by heat gradually at 212°, instantly at 554°. It is an extremely powerful oxidizing agent, possesses strong bleaching and disinfecting powers; corrodes cork, caoutchouc, and other organic substances; oxidizes iron, copper, and even silver when wetted, as well as dry mercury and iodine. O. was liquefied, 1882, by the French chemists, Hautefeuille and Chappuis, by applying a pressure of 125 atmospheres to richly oxidized oxygen at 148°. Liquid O. is of a dark indigo-blue color.

P

P, p, *pē:* sixteenth letter of the English alphabet, a consonant; with *k* and *t* called a pure mute as producing no sound. P was in Hebrew called *pe*, i.e., mouth, probably from its original form. P is the thin letter of the labial series (*p*, *b*, *f*, *v*), and is interchangeable with the other letters of the series. P, in Sanskrit, Greek, and Latin, is replaced by *f* in the Teutonic tongues. (See F.) Words *beginning* with *p* in English, and its kindred Teutonic tongues, are mostly of foreign origin (Slavic, Celtic, Latin), e.g., *pain* (Fr. *peine*, Lat. *pœna*), *plough* (Pol. *plug*), *pit* (Lat. *puteus*, a well). The Greek prep. *apo* (Skr. *apa*) became in Lat. *ab;* Gr. *hupo*, Lat. *sub;* Skr. *upa*, Lat. *ob;* but before sharp letters, as *t* and *s*, the original *p* was retained in pronunciation, as is shown by inscriptions (*apstulit*,*optinui*). There are remarkable interchanges of *p* with the sharp guttural *k* or *q*. Thus, for Lat. *quis*, *quod*, *quam*, the Oscan dialect had *pis*, *pod*, *pam;* Lat. *equus*, *coquo*, corresponded to Gr. *hippos* (Æol. *hikkos*), *pepo;* similarly, Gaelic *mac* (son), *ceathair* (Lat. *quatuor*, four), *coig* (Lat. *quinque*, five), correspond to Welsh *map*, *pedwar* (Gr. *pettores*), *pump* (Gr. *pente* or *pempe*). In Gr. *p* is sometimes replaced by *t* as *tis*, *tessares*, for *pis*, *pettores*. In such words as *redemption*, *consumption*, *p* has been introduced as an intermediary between the incompatible sounds *m* and *t*. The initial *p* of Latin words has mostly passed into French unaltered; in other positions, *p* has become *v;* thus, Fr. *évêque*, *cheveu*, *décevoir*, *pauvre*, from Lat. *episcopus*, *capillus*, *decipere*, *pauper*.

PAAS, n. *pawss* [L. and Gr. *pascha*, remotely from the Hebrew *pesachh*, the feast of Passover or Easter]: the festival of Easter; sometimes used in the vicinity of New York.

PABULUM, n. *păb′ū-lŭm* [L. *pab′ulum*—from *pasco*, I feed: Sp. *pabulo*]: nourishment; that which feeds; food; fuel. PAB′ULAR, a. *-lėr*, or PAB′ULOUS, a. *-lŭs*, pertaining to food. PAB′ULA′TION, n. *-lā′shŭn*, the act of feeding.

PACA, n. *pā′kă* [Port. *paca*], (*Coelogenys*): genus of rodent quadrupeds, allied to the agoutis, cavies, and capybara, and inhabiting Brazil, Guiana, and some of the W. India Islands. The dentition very nearly resembles that of the agoutis. The cheek-bones are prodigiously developed, in a way of which no example exists in any other mammalian animal, so that the zygomatic arches inclose a large hollow space, while

the bone also descends to an unusual depth from the arch, even below the lower jaw-bone. Within this structure, which gives an extraordinary breadth and peculiar aspect to the face, is a sac in each cheek, opening in front, and lined with a fold of the skin of the face. The whole of this seems to be intended to preserve the true cheek-pouches from external shocks. The cheek-pouches open from the mouth in the usual way, and are capable of very great distention. The lip is cloven; the ears are small; the eyes are large and full; the neck is short; the tail is a mere tubercle; the feet have each five toes; the legs are thick; the back is rounded. The form and gait are clumsy, yet the P. (*C. paca*) is very quick and active. It lives in moist grounds, burrowing like the rabbit, but not so deeply; its burrow, however, is always provided with three openings. It feeds on vegetable substances, and often does great damage to plantations of sugar-cane. It is one of the largest rodents, being about two ft. long. It is generally of dark brown color, with four rows of white spots along the sides, the throat and belly white. A lighter-colored species has been described, but is perhaps a mere variety. The flesh of the P. is much esteemed, and is very fat.

PACA, *pā′ka*, WILLIAM: 1740, Oct. 31—1799; b. Wye Hall, Harford co., Md. He graduated from Philadelphia College at the age of 19, studied law in London, practiced at Annapolis, was an ardent patriot, member of the state legislature 1771–74, member of congress 1774–79, signed the Declaration of Independence, was a member of the state senate 1777–79, chief justice of the state of Md. 1778–80, and chief judge of the court of appeals 1780–82, gov 1782–86, member of the Constitutional Convention 1788, was appionted district judge 1789,and held the office till his death. He died at Wye Hall.

PACAY, *pă-kā′* (*Prosopis dulcis*): tree of nat. order *Leguminosæ*, suborder *Mimoseæ;* native of Peru, of rather large size, with a broad head; producing pods 20 to 24 inches long, which contain black seeds imbedded in a sweet flaky substance as white as snow, which is used as food and much relished by the Peruvians.

PACCHIONIAN BODIES, n. plu. *păk′kĭ-ō′nĭ-ăn bŏd′ĭz* [after *Pacchĭōnī*, Italian anatomist]: in *anat.*, numerous small, round, fleshy-looking elevations found on the external surface of the dura-mater, or other cerebral membranes.

PACE, n. *pās* [F. *pas*, a step—from L. *passus*, a step: It. *passo*, a step]: step: measure of five feet: manner of walking: a particular movement, natural to some horses and taught to some others, in which both legs of the same side are lifted together—known also as *racking:* degree of celerity. Pace, in its modern acceptation, is the distance, when the legs are extended in walking, be-

tween the heel of one foot and that of the other. Among disciplined men, the pace becomes of constant length, and as such is of the utmost value in determining military movements, the relative distances of corps and men, etc., being fixed by the number of paces marched. The military pace is $2\frac{1}{2}$ ft. for ordinary marching, and 3 ft. for 'double-quick' or running time.—The Roman pace had a different signification, and it is important to bear the distinction in mind, when reading of distances in Latin works; the single extension of the legs was not with the Romans a pace (*passus*), but a step (*gradus*); their pace (*passus*) being the interval between the mark of a heel and the next mark of the *same* heel, i.e., a double step. This pace was equivalent to 4·84 English ft. The pace was the Roman unit in itinerary measure; the mile being 1,000 paces, or 5,000 Roman ft., equal to ·917 of an English mile: see MILE. Whether measurements were effected by actually counting the paces, or by the time occupied, is not clear; but either method would, with disciplined troops, give a safe result. In the middle ages, writers confuse accounts of distances by allusion to a geometrical pace, a measure which varied with different authors. PACE, v. to measure by steps or paces; to walk slowly or deliberately. PA′CING, imp. PACED, pp. *pāst:* ADJ. having a particular or deliberate manner of walking, as slow-paced, applied to horses; trained in any course or movement, as a horse. PA′CER, n. *-sėr*, one who steps or paces. GREAT PACE, a rapid rate of movement, as in walking. SLOW-PACED, a. not prompt or quick. THOROUGH-PACED, a. complete in all respects; going all lengths. TO KEEP OR HOLD PACE WITH, to keep up with; to move as fast as.

PACHA, PACHALIC, etc.: see PASHA.

PACHOMETER, n. *pa-kŏm′ĕ-tėr* [Gr. *pachus*, thick; Eng. *meter*]: an instrument for measuring the thickness of the glass of mirrors.

PACHOMIUS, *pa-kō′mĭ-ŭs:* Egyptian monk: b. toward the end of the 3d c., held in high estimation by the Rom. Cath. Church, as the first to substitute for the free asceticism of the solitary recluse, a regular cœnobitic system. He was brought up as a pagan, but converted to Christianity by the kindness of certain Christians whom he met at Thebes. About A.D. 340, at Tabenna, an island in the Nile, he founded the first monastic institution. The members agreed to follow certain rules of life and conduct drawn up by P., and to subject themselves to his control and visitation. He established also the first convent for nuns, which was under the presidency of his sister; and he labored with so much diligence and zeal, that at his death, according to Palladius, not fewer than 7,000 monks and nuns were under his inspection, The various writings extant under the name of P. are—*Regulæ Monasticæ* (of doubtful genuineness), *Monita*, *SS. PP. Pachomii et Theodori*, *Epistolæ et Verba Mystica* (a farrago of unintelligible allegory), and *Præcepta S. Pachomii.*

PACHYCARPOUS, a. *păk′ĭ-kär′pŭs* [Gr. *pachus*, thick; *karpos*, fruit]: in *bot.*, having the pericarp very thick.

PACHYCORMOUS, a. *păk′ĭ-kŏr′mŭs* [Gr. *pachus*, thick; *kormos*, a trunk]: in *geol.*, denoting a genus of fossil sauroid fishes having thick bodies.

PACHYDACTYL, n. *păk-ĭ-dăk′tĭl* [prefix *pachy-*; Gr. *daktulos*, a finger]: animal having thick toes.

PACHYDERMATA, n. plu. *păk′ĭ-dĕr′mă-tă*, or PACHY′DERMS, n. plu. *-dĕrms* [Gr. *pachus*, thick; *derma*, a skin, *dermatos*, of a skin]: order or group of orders of animals distinguished by the thickness of their skins, or having hoofs, as the elephant and horse, and many fossil animals. PACH′YDER′MATOUS, a. *-dĕr′mă-tŭs*, thick-skinned.—*Pachydermata*, in the system of Cuvier, constituted an order of Mammalia, including part of the *Bruta* (Rhinoceros, Elephant), and all the *Belluæ* (Horse, Hippopotamus, Tapir, Hog, etc.) of Linnæus, besides one genus (*Hyrax* or Daman) of the Linnæan *Glires*. But subsequent investigation has demonstrated so close an alliance to be unnatural, and probably no other Cuvierian order has been so thoroughly broken up. The elephants and hyrax now form two small independent orders—*Proboscidea* and *Hyracoidea*. The pigs and hippopotami form the non-ruminant division of the ungulate sub-order—*Artiodactyla* (q.v.), while the closely-allied tapir, rhinoceros, and horse represent the perissodactyl ungulates. As defined by Cuvier, the order consists of those hoofed mammalia (*Ungulata*) which are not ruminant; all of which possess, as a more positive character, a remarkable thickness of skin. This order he divides into three sections—(1) *Proboscidea*, having a prolonged snout or proboscis, through which the nostrils pass as elongated tubes, a powerful organ of prehension, and a delicate organ of touch, and having also five toes on each foot, inclosed in a very firm horny skin: (2) *Ordinaria*, destitute of proboscis, though in some (Tapirs), there is such an elongation of the upper lip and nostrils as approximates to it; and the nose is employed by hogs, etc., in seeking their food, not only as an organ of smell, but as an instrument for turning up the ground, and as an organ of touch; the number of toes varies, four, three, or two on each foot; those with an even number of toes having in the cleft foot a resemblance to the *Ruminantia*: and (3) *Solidungula*, in which the foot has but one apparent toe, inclosed in a hoof. Some naturalists have thought it better to separate the *Solidungula* or *Equidæ* (q.v.) from the P., as a distinct order; while others have enlarged instead of restricting the limits of the order, by adding, as a fourth section, the *Herbivorous Cetacea*, now known as *Sirenia*.

Those P. which have a number of toes differ completely from the mammalia having claws (*Unguiculata*) in their inability to bend their toes in order to seize any object. Some of the *Edentata* have very large hoof-

like claws, but this difference still subsists. The forelimbs of the P. are also incapable of any rotatory motion, serving for support and locomotion only, not at all for prehension; the metatarsal and metacarpal bones being consolidated as in the *Ruminantia*; and they have no clavicles.

The largest terrestrial mammalia belong to this order. Most of the P. are of large size, though the damans are a remarkable exception, and some of the hog family also are comparatively small. Most of them have a clumsy form, with slow and awkward gait; but they are capable of activity beyond what might be supposed, and sometimes move at a rapid pace. Gracefulness and fleetness are characteristics of the otherwise exceptional *Solidungula*. The *P. Ordinaria* have generally great strength, and the larger ones push their way through the entangled thickets of tropical forests, bending or breaking the lianas, small trees, and branches which oppose their progress, their thick hides resisting the spines and broken branches by which the skins of other animals would be pierced. The horse and other *Solidungula* are not inhabitants of forests and jungles, but generally of grassy plains, and their hides are much less thick and hard than those of most of the Pachydermata.

The physiognomy of the P. in general is rather dull and unexpressive, the eyes being small, and having that character of which a familiar example is the common hog. When enraged, however, they manifest their fierceness in their eyes; and though, in general, mild and gentle, they are capable of being aroused to great fury. The skeleton of the *P. Ordinaria* and *Proboscidea* is strong and massive; the neck short, the processes of its vetebræ are strongly developed; the skull affording a large surface for the muscles which support and move it. The P. generally feed on vegetable substances. Some are omniverous. The digestive organs are more simple than in the *Ruminantia*, but exhibit considerable diversity. The stomach is simple in some, and in others is more or less divided into sacs, approaching to one of the most remarkable characters of the *Ruminantia*. The intestines are generally longer than in the *Ruminantia*. The dentition exhibits considerable diversity; the adaptation to vegetable food being the prevalent character. For the most important peculiarities of the dentition and digestive organs, see the titles of particular families and genera.

PACHYOPTEROUS, a. *păk′ĭ-ŏp′tĕr-ŭs* [Gr. *pachus*, thick; *pteron*, a wing]: thick-winged.

PACHYSPONDYLUS, n. *păk′ĭ-spŏn′dĭ-lŭs* [Gr. *pachus*, thick; *spon′dulos*, more commonly *sphondulos*, a joint of the backbone]: a generic term applied to the fossil vertebræ of certain large lizard-like animals.

PACIFIC, a. *pă-sĭf′ĭk* [F. *pacifique*—from L. *pacĭfĭcus*, peacemaking—from *pax* or *pacem*, peace; *făcĭō*, I make: It. *pacifico*]: peacemaking; conciliatory; appeasing; calm. PACIF′ICALLY, ad. *-ĭ-kăl-lĭ*. PACIFICA′TION, n. *-kā′shŭn*, the act of peacemaking. PACIF′ICA′TOR, n. *-kā′tėr*, one who makes peace. PACIF′ICA′TORY, n. *-kā′-tėr-ĭ*, tending to make peace. PAC′IFY, v. *păs′ĭ-fī* [F. *pacifier*—from L. *pacĭfĭcārė*, to pacify]: to restore peace to; to quiet or appease; to allay excitement or agitation; to soothe; to tranquillize. PAC′IFYING, imp. PAC′IFIED, pp. *-ĭ-fīd*. PAC′IFIER, n. *-fī-ėr*, one who pacifies or quiets. —SYN. of 'pacific': mild; gentle; quiet; peaceful; peaceable; tranquil.

PACIF′IC OCEAN: largest of the five great oceans (see OCEAN). It lies between America on the east, and Asia, Malasia, and Australasia on the west. The name 'Pacific,' given—it is said—by Magellan, the first European navigator who traversed its wide expanse, is doubtless appropriate to certain portions of this ocean; but, as a whole, it has no special claim to the epithet.

The greatest length of the P. O. from the Arctic (at Behring's Strait) to the Antarctic circles is 9,200 m., and its greatest breadth, along the parallel of latitude 5° n., about 10,300 m.; area approximately estimated 80,000,000 English sq. m., or about $\frac{2}{5}$ of the whole surface of the globe. Its form is rhomboidal, with one corner incomplete (at the south), and its surface is studded with numberless islands, either scattered or in groups; these, however, are chiefly on the w. side. Along the whole e. side, is a belt of sea of varying width, which, with very few exceptions, is free from islands. The deepest sounding yet found (n. lat. 11° 24′, e. long. 143° 16′) is 26,850 ft., or more than 5 m.—nearly equal to the height of the highest mountain on the globe. The coasts present a general resemblance to those of the Atlantic, and the similarity in the outline of the w. coasts of each is striking, especially n. of the equator; but the shores of the P. O., unlike those of the Atlantic, are sinuous, and, excepting the n.e. coast of Asia, little indented with inlets. The shore on the American side is bold and rocky, while that of Asia varies much in character. Though the P. O. is by far the largest of the five great oceans, being about equal to the other four in extent, the proportion of land drained into it is comparatively insignificant. Its basin includes only the narrow strip of the American continent w. of the Andes and Rocky Mountains; Melanesia (except almost the whole of Australia), which contains few rivers, and none of large size; the Indo-Chinese states, China Proper, with the e. part of Mongolia, and Manchuria.

Winds.—The trade-winds of the Pacific have certain peculiarities, only lately discovered. In general, they preserve their peculiar characteristics only within certain limits; thus, the s.e. trades are found to blow steadily only between 92° and 140° w. long.; while the n.e. trades are similarly fluctuating, except between

long. 115° and 214° w. Beyond these limits, their action is in whole or in part neutralized by the monsoons and other periodical winds peculiar to the tropical regions of the Pacific. In Polynesia, especially near the New Hebrides group, hurricanes are frequent from Nov. to Apr., but with few of the terrible characteristics which distinguish the hurricanes of the W. Indies and Indian Ocean. N. and s. of the tropical zone, the winds exhibit little periodicity, being found to blow from all parts of the compass at any given season of the year, though a general w. direction is most frequent. On the coast of Patagonia and at Cape Horn, w. winds prevail during the greater part of the year, while in the Sea of Okhotsk they are rare. The frightful Typhoon (q.v.) is the terror of mariners in the Chinese seas, and may occur at any season of the year. There are many other winds and storms, such as white squalls, cyclones, 'tempestades,' etc., confined to particular localities (see their special titles: also STORMS).

Currents.—The currents are less marked in character and effects than those of the Atlantic. The *Southern Pacific current* takes its rise s. of Van Diemen's Land, and flows e. at the rate of half a mile per hour, dividing into two branches about long. 98° w., the n. branch or *Current of Mentor* turning n., and gradually losing itself in the counter equatorial current; the s. branch continuing its e. course till it is subdivided by the opposition of Cape Horn into two branches, one of which, *the cold current of Peru* or *Humboldt's current*, advances n. along the w. coast of S. America, becoming finally absorbed in the equatorial current; the other washing the coast of Brazil, and becoming an Atlantic current. The P. O., like the Atlantic, possesses its equatorial current, separated into a n. and s. current by the equatorial counter-current. It sweeps across the whole ocean from e. to w. Two subdivisions of the s. current, called respectively the 'current of Rossel' and the 'warm current of Australia,' flow, one through the Polynesian archipelago to New Guinea, the other along the e. coast of Australia. The n. equatorial current, after reaching the coast of Asia, turns n.e., washing the shores of China and Japan, under the name of the *Black* or *Japan current;* it then sends off a branch along the coast of Kamtchatka, and advances e. till it becomes lost on the n.w. coast of N. America. There are minor currents, the most remarkable of which is that of Fleurieu, which describes a kind of irregular circle with a radius of about 240 m., in lat. 25°–40° n. and long. 133°–155° w. All these currents have their corresponding counter-currents.

There are two 'sargassos' or weedy seas of considerable extent in the P. O., one 15° e.s.e. of New Zealand; the other, and by far the larger, about 15° w. of San Francisco. There is also a large region nearly half-way between Cape Horn and New Zealand, which seems to correspond to the deserts on land, as mariners report it almost wholly destitute of any signs of life either in sea or in air.

History.—The existence of this ocean became known to Europeans first through Columbus, who had received accounts of it from some of the natives of America, though it was seen first by Balboa, 1513, Sep. 29, and first traversed by Magellan eight years later; but its size, limits, and the number and position of its islands, etc., were little known till long afterward. Capt. Cook deserves the first place among the investigators of the Pacific Ocean; and after him come Anson, the two Bougainvilles, La Perouse, Carteret, Vancouver, Kruzenstern, Kotzebue, etc. The most thoroughly scientific examination of its physical condition is that accomplished by the *Challenger* Expedition 1873-76. Consult: Burney, *Chronological History of Discoveries in the South Sea;* Colquhoun, *Mastery of the Pacific;* Thomson and Murray, *The Challenger Expedition* (1880-95).

PACIFIC UNIVERSITY: established in 1854, at Forest Grove, Ore., under the auspices of the Congregational Church. The collegiate department confers the degrees of bachelor of arts, bachelor of science, and bachelor of letters; there is also a normal course and a preparatory department. The university is coeducational. In 1907 the grounds and buildings were valued at $85,000; the productive funds amounted to $213,000; and the annual income was $22,000. The library contained 14,700 volumes; the students numbered 231 and the faculty 21.

PACINIAN BODIES, *pă-sĭn'ĭ-ăn*, or PACINIAN CORPUSCLES, n. plu. [after *Pacini*, Italian anatomist]: one of the forms in which the nerves terminate in the skin. In the human subject, they are found in great numbers in connection with the nerves of sensation in the hand and foot, and sparingly with other spinal nerves, and in the mesentery. They always present a *proximal end*, attached to the nerves by a stalk of fibrous tissue prolonged from the neurilemma; and a *distal end*, lying free in the connective or areolar tissue. In the human subject, the corpuscles vary in length from one-twentieth to one-tenth of an inch. They are usually seen very readily in the mesentery of the cat, appearing as pellucid oval grains, rather smaller than hemp-seed. They consist of a series of concentric capsules, inclosed one within the other, and of a single non-medullated nerve fibre, which terminates in a swollen extremity. The capsules are separated by a clear space containing fluid.

PACINOLO, PACCIOLI, or PACIMOLO (LUCAS DI BORGO): an Italian mathematician: b. Tuscany 1440; d. 1515. He was a Franciscan monk, and taught mathematics at Florence, Venice, Padua, Naples and Rome. His chief work, *Summa de Aritmetica, Geometria, Proportioni et Proportionalita* is important as being the first treatise on mathematics ever printed, and as embodying the results of mathematical research up to that time. A treatise on bookkeeping (published 1495) is also attributed to Pacinolo.

PACK, n. *păk* [Dut. *pak;* Icel. *pakki;* Sw. *packa;* Ger. *pack,* a pack, a bundle: Ir. *pac* and *pacadh,* a pack: comp. L. *pango,* I fasten or make fast; *pactus,* fastened or made fast: Esthon. *pakima;* Fin. *pakkata,* to stuff, to cram]: a bundle or bale tied up for convenient carriage; a load; a set of playing-cards; a great number or quantity; a body of hounds for hunting; a number of persons confederated, in an ill sense; a weight of wool 240 lbs.: V. to bind together tightly and firmly; to place in close order; to select and put together persons for an unjust object, as, to *pack* a jury; to put together necessaries for a journey; to tie up goods for carriage; to go or send off in a hurry. PACK'ING, imp. binding in a bundle; pressing together in a box or barrel, as herrings: N. the act of binding together in a bundle; material used in making water or air tight; in *OE.,* tricks; falsehoods. PACKED, pp. *păkt.* ADJ. bound or pressed together; sent off; selected and put together for a particular purpose, usually in a bad sense. PACK'ER, n. *-ėr,* one who packs goods. PACK'AGE, n. *-āj,* a bundle or bale of goods. PACK'ET, n. *-ĕt* [OF. *pacquet,* a packet—from mid. L. *paccus,* a bundle]: a small pack; a small parcel as of loose papers or letters; a vessel regularly sailing between two or more ports for the conveyance of letters, passengers, and light goods; also called a PACKET-BOAT or PACKET-SHIP. PACK-CLOTH, cloth for packing. PACKHORSE (see below). PACK-HORSEMAN, pedler carrying a pack on horseback. PACK-ICE, in the *polar regions,* an assemblage of large pieces of floating ice. PACKING-CASE, a deal or other box for protecting heavy goods in transport. PACK-LOAD, the average load an animal can carry on its back. PACKMAN, one who carries a load of articles on sale from place to place; a pedler. PACK-SADDLE, a saddle suited for carrying loads on. PACK-SHEET, a strong, coarse material for packing goods in; a large cover for goods in a wagon. PACK-THREAD, strong thread or twine for making up packs.

PACKARD, *păk'ėrd,* ALPHEUS SPRING, Jr., M.D.: naturalist: b. Brunswick, Me., 1839, Feb. 19; d. 1905; son of Alpheus Spring P., D.D. (1799-84), who was for 65 years prof. in Bowdoin College. The son was graduated at Bowdoin 1861, and at the Maine Medical School 1864. He was associated 1865 with A. Hyatt, E. S. Morse, and F. W. Putnam, in establishing the Peabody Acad. of Science in Salem, Mass., and was for some time director of its museum. In 1871-73 was state entomologist of Mass.; 1875-77 he was attached to the U. S. geol. survey. From 1878 until his death he held the chair of geology and zoology in Brown University. His published works number more than 400, including *Our Common Insects* (1873); *Life History of Animals* (1876), and *Lamarck, the Founder of Evolution* (1901). He was president of the Zoological Congress held at Paris in 1889, and was the founder and for 20 years editor of the *American Naturalist.*

PACKER, *păk'ẽr*, Asa: 1805, Dec. 29—1879, May 17; b. Groton, Conn. At the age of 17, seeking employment, he walked to Susquehanna co., Penn., obtained an interest in Lehigh valley canal boats, became a storekeeper 1831, and a few years later a contractor and boat-builder, and engaged in mining. He was a member of the Penn. legislature 1844, county judge 5 years, planned and carried to completion the Lehigh Valley railroad, which opened the coal region and made him the wealthiest man in the state. He served two terms in congress 1853-57, was an unsuccessful candidate for gov. of Penn. 1869, and was one of the commissioners of the Centennial Exhibition at Philadelphia 1876. He founded Lehigh Univ., at South Bethlehem, Penn., 1865, giving 115 acres of land and $500,000; and at his death left $1,000,000 to increase its endowment.

PACKER COLLEGIATE INSTITUTE: in Brooklyn; established as the Brooklyn Female Acad. 1845; destroyed by fire 1852; rebuilt through the generosity of Mrs. William F. Packer; rechartered under its present name 1853; and opened 1854. It has primary, preparatory, academic and collegiate departments and a course, comprising all, of 12 years, the collegiate course being 6 years. It is supported principally by tuition fees, is governed by a board of 16 trustees, and its graduates are admitted to colleges as senior students. In 1905-6, it had 60 professors and instructors, 622 students and 26 scholarships valued at $3,000 each. Students may select one, two or three courses of study, exceptions being occasionally made. The Institute library contains between 8,000 and 9,000 volumes. The building contains a Gothic chapel with sittings for 800 persons; gymnasium 100 x 26 x 16 ft., equipped by the alumnæ; physical and chemical laboratories; well-lighted library; and many study and recitation rooms. Its sanitary appointments are excellent, and its general furnishing is suggestive of comfortable and refined home life.

PACKFONG, n. *păk'fŏng*, or Petong: in China, a white alloy of arsenic and copper; formed by putting two parts of arsenic in a crucible with five parts of copper turnings, or finely divided copper; the arsenic and copper require to be placed in alternate layers, and the whole is covered with a layer of common salt, and pressed down. When melted, the alloy contains nearly the whole of the arsenic, and is yellowish-white in color when in the rough state, but takes a fine white polish resembling silver. It is not very ductile, and cannot be fused without decomposition, as the arsenic is easily dissipated. It was formerly much used in Europe, as well as China and India, for making the pans of small scales, dial-plates, and a variety of other articles requiring nicety. In China it is still extensively employed.

PACK'HORSE: horse employed in the carriage of goods, which are either fastened on its back in bundles, or, if weighty, are placed in panniers, slung one on each side across the horse's back. This mode of conveying goods was formerly very common. The saddle to which the bundles were fastened consisted of two pieces of wood, curved to fit the horse's back, and joined together at the ends by other two straight pieces. This frame was well padded underneath, to prevent injury to the horse's back, and was firmly fastened by a girth. To each side of the saddle, a strong hook was attached, for carrying packages, panniers, etc. Panniers were sometimes simply slung across the horse's back with a pad under the

Packhorse and Panniers.

band. The panniers were wicker baskets, of various shapes according to the nature of their usual contents, being sometimes long and narrow, but usually having a length of three ft. or more, a depth of about two-thirds the length, and a width of one to two ft. In the mountainous regions of Spain, Austria, and some other countries, this is still almost the only mode of transport; though the mule has, especially in Europe, been substituted for the horse.

An army requires to be accompanied by several thousand pack-animals, sometimes horses, but preferably mules; and in Asia, usually camels, or elephants.

PACKWAX, n. *păk'wăks* [OE. *fax;* AS. *feax*, hair, and AS. *weaxan*, to grow]: a large tendon of a yellowish color in the neck of animals—also spelled PAXWAX.

PACO, n. *pā'kō*, or PACOS, n. *pā'kōz* [Peruvian, *paco*]: the alpaca; the Peruvian name for an earthy-brown oxide of iron, containing minute particles of native silver.

PACOURY-UVA, *pă-kow'rĭ-ū-vâ:* sweet and delicious Brazilian fruit, a large berry produced by the *Platonia insignis*, tree of nat. order *Clusiaceæ*. The seeds have the taste of almonds.

PACT, n. *păkt*, or PACTION, n. *păk'shŭn* [F. *pacte*, a pact—from L. *pactum*, an agreement—from *paciscor*, I agree, I stipulate]: a contract; an agreement. PAC'TIONAL, a. *-ăl*, by way of agreement. PACTUM ILLICITUM, in the law of Scotland, a contract or agreement for some illegal purpose, i.e., a purpose either expressly prohibited by statute, or by the general policy of the law; an 'illegal contract,' as it is termed in other systems of law. Thus a contract between a client and agent, called a *pactum de quota litis*, whereby a share of the property which is the subject of litigation is given to the agent instead of his usual fees, is void in most cases; though it is often difficult to determine what contracts fall within this rule. The courts, however, construe very jealously every contract which tends to corrupt the administration of the law. So agreements by a client to give an excessive sum to his law-agent as a gift have been often set aside.

PACTOLUS, *păk-tō'lŭs:* anciently the name of a small brook of Lydia, in Asia Minor, rising on the n. slope of Mount Tmolus (modern *Buz Dagh*), flowing n. past Sardis (*Sart*), and emptying into the Hermus (*Kodus*). It is nowhere more than ten ft. broad, and one ft. deep. The sands or mud of P. were long famous in antiquity for the particles of gold dust which they contained, supposed to have been carried down by its waters from Tmolus—a hill rich in metals. The collection of these particles, according to legend, was the source of Crœsus's vast wealth. But as early even as the time of Strabo, P. had ceased to yield any of the precious dust. The brook is now called *Sarabat.*

PAD, n. *păd* [Dut. *pad*, a path: Low Ger. *pad*, the sole of the foot; *pedden*, to tread: Fin. *padet*, a footpath: connected with L. *pedis*, of a foot]: a robber who infests a road on foot, usually in the form *footpad;* an easy-paced horse: V. to travel slowly; to rob on foot. PAD'DING, imp. PAD'DED, pp.

PAD, n. *păd* [Fin. *padja*, a long sort of pillow: Dut. *pakje*, a packet: Sp. *paja*, straw, chaff: Swiss, *bätsch*, a lump: connected with *pod*]: a separate mass or pack, as of wool; a bunch, as of skeins of yarn; a flat cushion; a soft saddle; a thick mass of sheets of blotting-paper for writing on: V. to stuff with padding; to impregnate cloth with a mordant. PAD'DING, imp.: N. the material used for stuffing; the stuffing of a coat, saddle, and the like; the act of imbuing with a mordant. PAD'DED, pp.: ADJ. stuffed with a soft substance.

PADANG, *pâ-dâng':* capital of the Dutch govt. of the w. coast of Sumatra, 0° 59′ 30″ s. lat., and 100° 20′ 30″ e. long. The Padang flows through the town, but is navigable for only small vessels, the larger anchoring in the roadstead, about three m. distant. On the left bank, stand the houses of the natives, unsightly bamboo erections, elevated about eight ft. from the ground by posts of the cocoa-nut tree, and covered with leaves. The

govt. buildings, houses of the Europeans and Chinese, etc., are on the right, and mostly of wood or stone, roofed with tile. P. is picturesquely inclosed by a semicircle of mountains, behind which rises a loftier chain, two being volcanoes. There are a Prot. church, Rom. Cath. church, flourishing schools, fort, military hospital, govt. workshops, large warehouses, etc. An agent of the Netherlands Trading Company (q.v.) resides at P., which is the centre of the exports and imports of Sumatra's w. coast, and has a lively trade with Java, the other islands of the E. Archipelago, and Europe, and with the interior of the island.

The climate is considered healthful, though the heat is great. Col. Nahuys found the thermometer range from 70° to 80° at 6 A.M., from 82° to 88° at noon, 84° to 90° at 2 P.M., 78° to 84° at 6 P.M., and 72° to 80° at 10 P.M.

The gov. resides at a country-house about two and a half m. above P., and rules a territory stretching from the s.e. corner of the island. It comprises the greater part of Sumatra, and is divided into the residencies of Lower P., Upper P., Tapanoeli (Tapanuli), Bencoolen, the Lampongs, and Palembang.

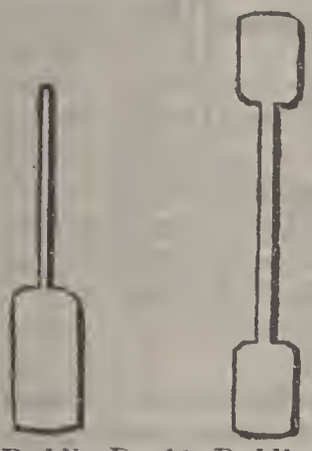
Lower Padang was the first dist. of the w. coast of Sumatra which submitted to the Dutch, who had formed a settlement at P. as early as 1660, and by repeated wars, gradually extended their territory.

Upper Padang is n.w. of the lower province, from which it is separated by a chain of lofty mountains, some of which, as the Singalang, Merapie, and Sago, are nearly 10,000 ft. in height; Merapie being an active volcano, the last eruptions of which were in 1845–55, though it sent forth volumes of smoke 1861. This residency possesses the most lovely districts of the island, or of any tropic land, the mountain slopes being studded with villages, rice-fields, cocoa-nut and coffee trees, of which last, it is calculated that there are 32,000,000 in Upper P. In addition to coffee, there is a large production of gambier, cassia, pepper, ratans, indigo, caoutchouc, etc.; and gold, iron, copper, lead, and quick silver are found. In the dist. of Tanah Datar is the town of Paggeroejong, former cap. of the powerful kingdom of Menangkabo, and the residence of the king.

Tapanoeli, the remaining residency under the govt. of Sumatra's w. coast, is n.w. of Upper P. The independent spirit of the inland natives has caused the Netherlanders much trouble, but each fresh outbreak only extends their territory and power further into the interior, and toward the n.w. of the island.

Pop. of the city of P. about 12,000; total pop. of Dutch possessions about 2,000,000, besides 3,000 Chinese and 2,000 Europeans. This is irrespective of Achin (q.v.).

PADDLE, v. *păd'l* [F. *patrouiller;* OF. *patouiller*, to paddle or dabble with the feet: It. *pattuglia;* Bav. *patschen*, to tramp: Low Ger. *patsch*, mud; *pladern*, to paddle: comp. F. *patte*, the foot]: to play in the water with the hands and feet; to beat the water, as with oars; to propel by an oar or paddle: N. a short oar with broad blades, used in propelling light boats and canoes; probably the precursor of the OAR (q.v.), and still its substitute among barbarous nations, and the appropriate implement for the Canoe (q.v.). It is of wood, consisting of a wide, flat blade with a short handle, by means of which the operator spoons the water toward him. In canoes for only one sitter, a double paddle is frequently used, which is dipped alternately on either side: the inhabitants of Greenland are especially skilful in this operation. The action of the paddle is the same as that of the oar, though less forcible. The paddle has, however, the advantage that the rower faces the bow of his boat, and sees what is before him —an appreciable gain in threading narrow streams. PAD'DLES, n. plu. *-lz*, the broad boards at the circumference of a water-wheel. PAD'DLING, imp. *-lĭng*. PAD'DLED, pp. *-ld*. PAD'DLER, n. *-lėr*, one who paddles. PADDLE-BOARDS, flat boards for catching the water, placed around a water-wheel. PADDLE-BOX, the structure confining the paddle-wheel of a steamboat. PADDLE-FISH, *Polyodon folium*, fish found in the Mississippi river and its affluents; about 5 ft. in length, with a bony snout about as long as the body, which it uses as a paddle to dig from the mud the animals that are its food. It has no scales, and is dark blue on the back and whitish on the belly. PADDLE-STAFF, a little spade used to clear the plowshare: see *Note* 2. PADDLE-WHEEL STEAMER, steamer propelled by paddle-wheels.



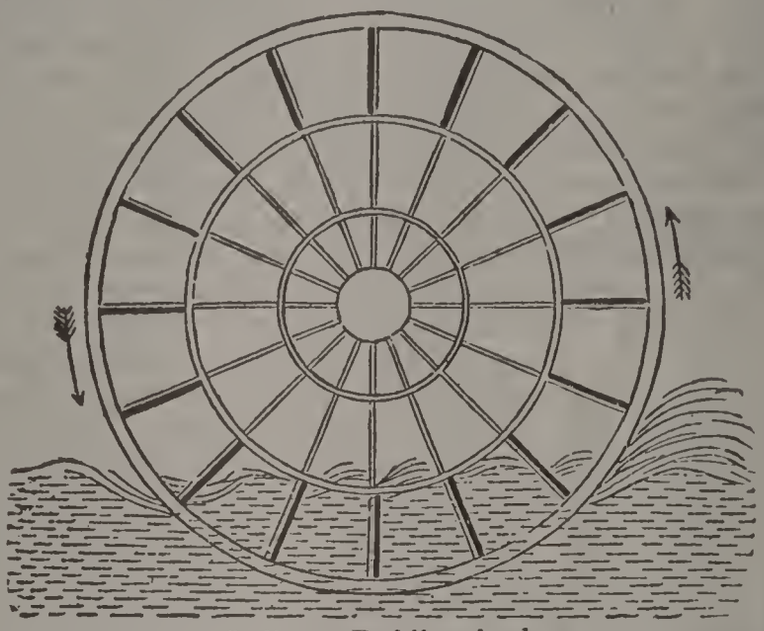
Paddle. Double Paddle.

Note 1.— PADDLE is a frequentative of *pat*, and thus signifies 'to pat often; to keep handling.' So we have Ger. *padden* and *paddeln*, to patter about, to walk with short steps.

Note 2.—PADDLE in OE. is used for SPADDLE, in the sense of a 'little spade or broad blade.'

PAD'DLE-WHEEL: one of the appliances in steam vessels by which the power of the engine is made to act on the water and produce locomotion. It is a skeleton wheel of iron, on the outer portion of whose radii flat boards, called floats or paddles, are fixed, which beat rapidly against the water, and produce continuously the same effect as is given in an intermittent manner by the blades of oars. The use of the P.-W. in conjunction with steam as a motive-power dates from about the commencement of the 19th c., but the employment of the P.-W. itself is ancient as the time of the Pharaohs. A specimen is known also to have been tried in the 16th c. in Spain.

In the ordinary form of paddle-wheel, that called the radial, the floats are *fixed*. Thus a certain loss of power



Ordinary Paddle-wheel.

is involved, as the full force of the engine on the water is experienced only when the float is vertical, and as on entering and leaving the water the power is employed mainly in depressing or lifting the particles of water. This objection has great force at the moment of starting, or when progress is very slow, as is illustrated by the small power that a paddle-steamer evinces when trying to tug a stranded vessel off a sandbank; but when in full progress, the action is less impeded by the disadvantage referred to, the water in front of the wheel being depressed, and that abaft being thrown into the form of a

Feathering Paddle-wheel.

wave. The extent of the immersion much influences the economy of power, as will be readily understood if the consequences of immersion up to the centre of the wheel be imagined. An immersion somewhat over the top of

the lowest float is the most advantageous, and in order that the floats may be as nearly as possible vertical when they strike the water, it is advisable to give the wheel as large a diameter as possible, and to place the axis at the highest available point in the vessel.

To overcome the drawbacks to the radial wheel, Elijah Galloway patented, 1829, the *Feathering Paddle-wheel*, in which the floats are mounted on axes, and are connected by rods with a common centre, which revolves upon a pin placed eccentrically to the axis of the paddle-wheel. By this method, the floats are kept, while immersed, at right angles to the surface of the water. So long as the water is smooth the gain is great, consequently feathered floats are much used in river-steamers; but for ocean-steamers the liability to derangement, perhaps at a critical period, is a great objection to their use.

The paddle-wheel, in revolving, imparts both a forward velocity to the vessel and a backward velocity to the water. The latter is called the *slip*, and sometimes bears a very large and wasteful proportion to the former. The absolute velocity of the paddle floats is equal to the sum of the slip and the forward motion of the ship, so that the wheel always revolves faster than the ship makes way.

In recent years the P.-W. has been very largely supplanted by the Screw-propeller (q.v.).

PADDOCK, n. *păd′ŏk* [AS. *pearroc*, an inclosure: OE. *parrock*, a little park—from *sparran*, to inclose, with dim. suffix *-ock*—see Skeat. Perhaps dim. of *pad*, a piece or patch: Swab. *pfatt*, an inclosure]: a small inclosed park adjoining a stable or mansion: see PARK.

PADDOCK, n. *păd′ŏk* [Icel. *padda;* Dut. *padde;* It. *botta*, a toad]: a frog; a toad. PADDOCK-STOOL, a mushroom or other fungus.

PADDY, n. *păd′dĭ* [a dim. of *Patrick*]: a familiar name for an Irishman.

PADDY, or PADI, n. *păd′dĭ* [Tamil and Malay name]: in *E. Indies*, rice in the husk. PADDY-FIELD, a field under rice cultivation: see RICE.

PADELION, n. *păd′ĕ-lī′ŏn* [F. *pas de lion*, foot of the lion]: a plant called lion's-foot; lady's-mantle; the *Alchĕmil′la vulgāris*, ord. *Rosācĕæ*.

PADELLE, n. *pă-dĕl′*, or PADELLA, n. *pă-dĕl′lă* [It. *padella;* OF. *padelin*, a frying-pan, a vessel for melting glass in: L. *patella*, a small pan or dish]: a large shallow metal or earthen cup or deep saucer containing fatty matter and a short thick wick, used in illuminations. PADELLES′, n. plu. *-dĕlz′*, or PADEL′LAS, n. plu. *-lăz*. The illumination of St. Peter's at Rome, and other large buildings in Italy, is effected by the tasteful arrangement of large numbers of these little pans, converted into lamps by partly filling them with tallow or other grease, and placing a wick in the centre.

PADERBORN, *pâ'der-bōrn:* chief town of a dist. in the Prussian province of Westphalia, 60 m. s.w. of Hanover; 51° 43′ n. lat., and 8° 45′ e. long.; in a pleasant and fruitful region, at the source of the Pader. Paderborn has some interesting buildings, e.g., the fine old cathedral, completed 1143, with its two magnificent façades, and containing the silver coffin in which are the remains of St. Liborius. Paderborn is the seat of a bp. and chapter, and of an administrative court. Paderborn, which ranked till 1803 as a free imperial bishopric, owes its foundation to Charlemagne, who nominated the first bp. 795. Several diets were held during the middle ages at Paderborn, then one of the most flourishing of the Hanseatic Cities, while it was numbered also among the Free Imperial Cities. Pop. 23,500.

PADEREWSKI, *pâ-dĕ-rĕf'skē,* IGNACE JAN: Polish pianist; b. Podolia, Russian Poland, 1860, Nov. 6. He began serious study of the pianoforte in 1867, continued his preparation from 1872 at Warsaw under Kiel and Roguski, toured Russia, Siberia, and Rumania, and became a professor in 1878 in the Warsaw conservatory, in 1884 in that of Strasburg. After further study with Leschetizky in Vienna, he made his formal appearance as a concert pianist in 1887. He played in London in 1890, and in 1892 in the United States, which he has frequently revisited. He became the best-known pianist of his time, distinguished alike for his technique and his intellectual interpretation. In 1902 he conducted in the United States his opera *Manru,* which achieved a great success. His interest in American music was shown by his placing in the care of trustees the sum of $10,000 for the encouragement of the composers of the United States. His compositions are largely for the pianoforte, and include *Elégie, op.* 4; *Danses Polonaises; Chants du Voyageur; Minuet; Dans le Desert;* and *Humoresques de Concert.*

PADIHAM, *păd'ĭ-ham:* large chapelry and township, in the higher division of the hundred of Blackburn, England; on an eminence on the n. bank of the Calder, and reached by the Rose Grove station of the Lancashire and Yorkshire railway, also by the Leeds and Liverpool canal. It is about 9 m. n.e. of Blackburn. The cotton trade employs a great proportion of the population; but coal-mines and extensive quarries add to industrial activity, and prosperity. Pop., 12,200.

PADILLA, *pâ thēl yâ,* JUAN LOPEZ DE: one of the most popular heroes in Spanish history; b. toward the close of the 15th c.; d. 1521, Apr. 24; scion of a Toledan family. He was appointed by Emperor Charles V. military commandant of Saragossa. A formidable rebellion, caused by the excessive taxes which the emperor imposed on the Spaniards, to defray the cost of his various wars in Italy, Germany, and the Low Countries, broke out among the towns (*Communidades*) of Castile, and the rebels, known as *communeros,* called Padilla to put himself at their head. The introduction of the religious

element into the quarrel tended greatly to strengthen the insurgents, and for a moment P. was the ruler of Spain, and formed a new junta to carry on the government. He was successful in a number of enterprises against the royalist party; but 1521, Apr. 23, was defeated by the royalists at Villalos, in a conflict which decided the fate of the rebellion. P. was taken prisoner, and next day beheaded.

His wife, DONA MARIA DE PACHECO, rallied the wrecks of the rebel army, and for a long time held Toledo against the royalist besieging force, and, after the capture of the city, retired to Portugal, where she soon died. With P. and his wife passed away the last remnant of the ancient freedom of Spain. Numerous poems and dramas celebrate their deeds.

PADISHA, n. *pă-dē'shâ* [Pers. *Padishah*, Turk. *Padishag*—from *pad*, protector; *shah*, king]: Great King, Emperor; one of the titles of the sultan of Turkey, and of the shah or sovereign of Persia. Formerly, this title was accorded only to the kings of France among European monarchs, the others being called *Kral*, king. It was subsequently allowed to the emperor of Austria, and later, by a special article in the treaty of Kutshuk-Kainardji (1775), to the autocrat of All the Russias. Of late it has been accorded to the monarchs of all the great European nations, and even to those of secondary states.

PADLOCK, n. *păd'lŏk* [from Eng. *pad*, in the sense of a lump, and *lock:* perhaps connected with mid. L. *pedānă*, a clog, a chain to tether the foot of an animal]: a lock hanging like a clog to an animal's foot; a hanging or portable lock, with a link, for putting through an eye or a staple: V. to shut; to confine. PAD'LOCKING, imp. PAD'LOCKED, pp. *-lŏkt.*

PADRON, *pâ-drōn':* a very ancient town of Spain, province of Coruña, 15 m. s.w. of Santiago, on the Sar, a few m. from the coast. P., being the place at which the body of Santiago is said to have landed itself, was formerly an important place of pilgrimage. Pop. over 8,000.

PADRONE, n. *pa-drō'nā* [It. a master, a patron]: a man, usually an Italian, who owns street-organs, and lets them out for hire—sometimes hiring players to operate them for a small fraction of the daily receipts, and exercising over them an almost despotic authority.

PADUA, *păd'ū-a* (It. *Padova*): ancient and picturesque city in n. Italy, on a beautiful plain on the Bacchiglione, 23 m. by railway w.s.w. of Venice, 18 m. s.e. of Vicenza. It is surrounded by walls and ditches, and fortified by bastions. Its houses are lofty, supported mostly on long rows of arches, generally pointed; and most of its streets, especially in the older quarters, are narrow, dark, dirty, and ill-paved. There are several handsome gates, as those of San Giovanni, Savonarolo, and Falconetto; a number of fine squares, of which the

Prato della Valle is largest and finest, and is surrounded by a stream; and several magnificent buildings. The Café Pedrocchi is esteemed the finest edifice of the kind in Italy. Portions of a Roman edifice were discovered while the foundations of this building were being made, and the marbles found now adorn the pavement, etc., of the *salone*. The Palazzo della Ragione, built 1172-1219, is the most peculiar and most national in the city. It is an immense building, forming one side of the market-place, rests wholly on arches, and is surrounded by a Loggia (q.v.) Its e. end is covered with shields and armorial bearings, and its roof is said to be the largest unsupported by pillars in the world. Its great rectangular hall is 267½ ft. long, 89 ft. wide, and 78 ft. high; is covered with mystical and metaphorical paintings, and contains a monument of Livy, the Roman historian, and a bust of Belzoni, the traveller, both natives of this city. The other chief edifices are the cathedral; the church of Sant' Antonio, a beautiful building in the Pointed style, with several Byzantine features, and remarkably rich and splendid in internal decorations; and the churches of San Giorgio and of Santa Giustina—all richly decorated with paintings, sculptures, etc. The Univ. of Padua, the most famous establishment in the city, was famous as early as 1221. Connected with it are an anatomical theatre and a botanic garden, both dating from the 16th c. There is also a museum of natural history, an observatory, a chemical laboratory, and a library of 140,000 vols. and 1,500 MSS. There are also numerous palaces, theatres, and hospitals. Pop. (1901) 93,560.

Padua, the Roman *Patavium*, according to a widespread belief of antiquity, alluded to by Virgil, was founded by the Trojan chief Antenor. During the first centuries of the Roman empire, it was the most flourishing city in n. Italy, on account of its great woolen manufactures. But in 452 Attila utterly razed it to the ground. It was rebuilt by Narses, again destroyed by the Lombards, but once more rose from its ashes, and became a very famous city in the middle ages. It fell into the hands of the Carrara family 1318; and 1405 was conquered by Venice, whose fortunes it has since shared.

PADUCAH, *pa-dū'ka:* Ky., city, county-seat of McCracken County; at the confluence of the Tennessee and Ohio rivers, and on the Nashville, C. & St. L. and the Illinois C. R.R.'s: about 35 miles in direct line east by north of Cairo, Ill., and 80 miles southwest of Evansville, Ind. It has steamer connection with Mississippi, Ohio, and Tennessee river ports. It was settled in 1821 by James and William Pore, and was incorporated 1830, Jan. 11. During the Civil War the city was occupied by General Grant in September 1861. It is in a productive agricultural region: in the vicinity are forests of hard and soft wood, and deposits of fire-clay, glass, sand, zinc, and fluor spar; limonite is found within 30

miles, and coal, in rich veins, within 60 miles. It has extensive manufacturing interests; the chief manufactures are pig iron, lumber, veneering, building material, spokes, rims, staves, headings, barrels, curtain poles, furniture, stoneware, pottery, saddles, collars, harnesses, tobacco products, knit goods, canned goods, brooms, brick, proprietary medicines, beer, and flour. It has a large ore milling plant and novelty works, in all 51 manufactories giving employment to about 3,000 persons, and the two railroads employ about 1,200. There is an extensive wholesale trade in clothing and food products, and in its own manufactures. The prominent public buildings are the United States government building, municipal buildings, churches, and schools. The educational institutions are Saint Mary's Academy, a high school, public and parish schools, and a number of private schools. There are 23 churches. The six banks have a combined capital of $1,350,000; the bank clearings are annually about $50,000,000. The government is administered under a charter of 1893, which provides for a mayor, who holds office four years, a board of aldermen, eight in number, chosen each four years, and 12 councilmen chosen each two years. The city owns and operates the electric light plant. Pop. (1910) 22,760.

PA'DUS. See Po.

PÆAN, n. *pē'ăn* [L. *pæan*—from Gr. *paian*, a hymn in honor of Apollo]: name given by the ancient Greeks to a kind of lyric poetry originally connected with the worship of Apollo. The oldest pæans, as we learn from Homer, appear to have been either hymns addressed to that deity, to appease his wrath (*Iliad*, i. 473), or thanksgiving odes sung after danger was over and glory won (*Iliad* xxiii. 391). At a later period, they were addressed to other deities also; thus, according to Xenophon, the Lacedæmonians sang a pæan to Poseidon after an earthquake, and the Greek army in Asia one to Zeus. In modern usage, Pæan is a song of triumph. PÆON, n. *pē'ŏn*, in *anc. poetry*, a foot of four syllables.

PÆSTUM, *pĕs'tŭm:* anciently a Greek city of Lucania, in s. Italy, in the present province of Salerno, on the *Sinus Pæstanus*, now the Gulf of Salerno, and not far from Mt. Alburnus. It was founded by the Trœzenians and the Sybarites, between B.C. 650 and 610, and was originally called Poseidonia (of which *Pæstum* is believed to be a Latin corruption), in honor of Poseidon (Neptune). It was subdued by the Samnites of Lucania, and slowly declined in prosperity after it fell into the hands of the Romans, who established a colony here about B.C. 273. The Latin poets celebrate the beauty and fragrance of its flowers, particularly its roses, which bloomed twice a year. Wild roses, it is said, still grow among its ruins, which retain their ancient property, and flower regularly in May and November. Pæstum was burned by the Saracens in the 10th c., and there is now only a

small village called Pesto, in a marshy, unhealthful, and desolate district; but the ancient greatness of the city is indicated by the ruins of temples and other buildings. These appear to have been noticed first in the early part of the 18th c., by Count Gazola, in the service of the king of Naples; they were described next by Antonini, in a work on the topography of Lucania (1745), and have since been visited by travellers from all parts of Europe.

PAEZ, *pâ-ĕth′*, José Antonio: 1790, June 13—1873, May 6; b. Venezuela. He was of Indian descent, joined the patriot army 1810, and with a small force, which he had collected, won several battles and became commander of the revolutionists. He won the independence of Colombia at the battle of Carabobo 1821, represented Venezuela in the new govt., secured the independence of Venezuela 1829, was its first pres., was re-elected 1839, and superseded 1846. He was exiled 1850 for heading a revolution, resided in New York till 1858, when he was invited to return to Venezuela; was minister to the United States 1860–1, dictator of Venezuela 1861–2, but failed to restore peace. He spent several years in the Argentine republic and Peru, and again came to the United States 1872. He published an autobiography, and his *Life* has been published by his son. He died in New York.

PAGAN, n. *pā′găn* [L. *pagānus*, a countryman, the villages having continued heathen after the cities, with more education and mental activity, had become Christian—from *pāgus*, a village: F. *paysan*, a peasant; *païen*, a pagan: It. *pagano*]: one who is not a Christian, a Jew, or a Mohammedan; a heathen; an idolater: Adj. heathenish. Pa′ganish, a. *-ĭsh*, pertaining to pagans; heathenish. Pa′ganize, v. *-īz*, to turn or convert to heathenism. Pa′ganizing, imp. Pa′ganized, pp. *-īzd*. Pa′ganism, n. *-ĭzm*, the worship of the whole human race except those portions which have embraced Christianity, Judaism, and Mohammedanism: heathenism; polytheism; idolatry; worship of gods that are no gods.

PAGANI, *pâ-gâ′nē:* uninteresting town of s. Italy, province of Salerno. In the church of St. Michele is the tomb of Alfonso de' Liguori, founder of the order of the Redemptionists, who died here 1787. The body is preserved in a glass case.—Pop. about 12,000.

PAGANINI, *pâ-gâ-nē′nē*, Nicolo: famous violinist: 1784, Feb. 18—1840, May 27; b. Genoa; son of a commission-broker. His musical talent showed itself in his childhood; in his ninth year, he had instructions from Costa at Genoa, afterward from Rolla at Parma, and from Ghiretti. In 1801 he began his professional tours in Italy; 1828 he created a great sensation on appearing for the first time in the principal towns of Germany; and 1831 his violin-playing created equal *furor* in Paris and London. His appearance in London was preceded by absurdly romantic stories of his imprisonment for 20 years in a dungeon where he had learned to

play on an old broken violin with only one string; and as a result, he could not walk the streets because of the crowd that gathered round him. P. amassed great wealth, though he was addicted to financial speculation and was generous in his gifts. His mastery over the violin has never been equalled in impressiveness and passionate power, moving his audiences at times to tears; but he was too much addicted to using his mastery in mere feats of musical legerdemain, such as his celebrated performance on a single string. His execution on the guitar also was very remarkable; for four years he made that instrument his constant study. P. died at Nice, of laryngeal phthisis, leaving a large estate.

PAGE, n. *pāj* [F. *page*—from L. *pāgĭna*, the page or leaf of a book—from *pango*, I fasten: It. *pagina*]: one side of the leaf of a book. PAGES, n. plu. *pā′jĕz*, a book or writing: V. to mark or number in pages. PAG′ING, imp.: N. the making up into pages; the marking or numbering the pages of a book. PAGED, pp. *pājd*.

PAGE, n. *pāj* [F. *page;* Dut. *pagie;* It. *paggio*, a serving-boy: Gr. *paida*, a child: Gael. *paisde*, a little boy or girl]: a boy (usually, though not necessarily) who attends on a great person, but who is not a menial; also, one who attends on a person of rank or affluence, and who is a menial. The practice of employing youths of noble birth, in personal attendance on the sovereign, existed in early times among the Persians, and was revived in the middle ages under feudal and chivalric usages. The young nobleman passed in courts and castles through the degree of page, preparatory to being admitted to the further degrees of esquire and knight. The practice of educating the higher nobility as pages at court began to decline after the 15th c., till pages became what they are now, mere relics of feudal usages. Four pages of honor, personal attendants of the sovereign, form part of the state of the British court. They receive a salary of £200 a year each, and, on attaining suitable age, receive from the sovereign a commission in the foot guards.—In legislative bodies in the United States, pages are boys or young men who attend on the officials of the body, or on the members—often developing such readiness and knowledge of usage in details of business as make them very serviceable in various ways. PAGE, v. in *OE.*, to attend as a page. *Note.—Pages* in olden times were not particularly young; the derivation may therefore be from mid. L. *pagĭŭm*, a servant; *pagensis*, peasant, rustic—and so from L. *pāgus*, a village: Prov. *pages*, a peasant: Port. *pagem*, a servant—see Littré and Skeat.

PAGE, HARLAN: 1791, July 28—1834, Sep. 23; b. Coventry, Conn. In 1825 he was appointed agent of the American Tract Society, at its headquarters in New York, and held this position till his death. He was noted for his piety and philanthropy, and for the skill and zeal of his personal effort with individuals, to lead them into the light of a Christian faith. See *Memoir* by the Rev. William A. Hallock (Amer. Tract Soc. 1835).

PAGE, JOHN, *pāj:* 1744, Apr. 17—1808, Oct. 11; b. Rosewell, Gloucester co., Va., colonial patriot and statesman; grandson of Mann Page, next to Lord Fairfax, the largest landholder in Virginia. He graduated at William and Mary Coll. 1763, was representative in the Virginia house of burgesses, member of the colonial council, and, 1776, delegate to the convention which framed the Virginia state constitution. During the revolution, he rendered important services as one of the committee of public safety and lieutenant-governor of the commonwealth, contributing largely to the cause from his private fortune. He represented Virginia in the national congress 1789, Mar. 4—1797, Mar. 3. In 1800 he was presidential elector, and 1802 was chosen governor of Virginia, in which capacity he served three years. He was distinguished for theological learning as well as for soldierly qualities. He died at Richmond.

PAGE, JOHN LLOYD WARDEN: English author: b. Minehead, Somerset, 1858, Aug. 25. After a dozen years' practice as a solicitor he retired in order to devote himself to topographical literature. Among his published works are: *Dartmoor and its Antiquities* (1889); *Exmoor* (1890); *The Rivers of Devon* (1893); *The Coasts of Devon and Lundy Island* (1895); *The Church Towers of Somerset,* with E. Piper (1890-1900); etc.

PAGE, THOMAS JEFFERSON: American naval officer: b. Shelly, Gloucester County, Va., 1808, Jan. 4; d. Rome, Italy, 1899, Oct. 26. In 1853-6 he was lieutenant-commander in explorations of the La Plata region in South America, and in February 1855 his vessel was fired upon from a Paraguayan fort. Resigning in 1861 he then entered the Confederate service, was commissioned commodore and in 1862 was sent to England to take charge of a cruiser. As, however, he was prevented from taking the ship out he secured the command of a small iron-clad at Copenhagen, which was soon after seized from him while in a Spanish port. Leaving the service he subsequently resided in Argentina and in Florence, Italy. He wrote *La Plata, the Argentine Confederation, and Paraguay* (1859).

PAGE, THOMAS NELSON, LL.B., LITT.D., LL.D.: American lawyer and author: b. Hanover County, Va., 1853, April 23. He was educated at Washington and Lee University, studied law for a year at the University of Virginia, was admitted to the bar, and established himself in practice at Richmond. His avocations became literature and lecturing. Perhaps no post-bellum writer has depicted

with so rare a skill the negro and white life of slavery, war-time, and reconstruction. His rendering of the Virginia colored dialect in such stories as *Marse Chan*, first printed in the *Century* 1884; later in the collection *In Ole Virgina* (1887), assumed a real philological importance. Among his further writings are: *Befo' de War*, poems by A. C. Gordon (1888); *On Newfoundland River* (1891); *Elsket* (1891); *The Old South*, essays (1892); *Among the Camps* (1891); *Pastime Stories* (1894); *The Burial of the Guns* (1894); *Unc' Edinburg Meh Lady; Social Life in Old Virginia; The Old Gentleman of the Black Stock* (1896); *Two Prisoners* (1897); *Red Rock* (1898); *Santa Claus' Partner* (1899); *A Captured Santa Claus* (1902); *Gordon Keith* (1903); *The Negro—the Southerner's Problem* (1904); *Bred in the Bone* (1905); *The Coast of Bohemia*, poems (1906); *Under the Crust* (1907); etc.

PAGE, Walter Hines: American publisher: b. Cary, N. C., 1855, Aug. 15. He was educated at Randolph-Mason College, Va., and Johns Hopkins University, was editor of *The Forum* 1890-5, literary advisor to Houghton, Mifflin & Co., publishers, 1895-9; and editor of *The Atlantic Monthly* 1896-9. Since 1900, November, he has been editor of *The World's Work* and a member of the New York publishing house of Doubleday, Page & Co.

PAGE, William: American artist: 1811, Jan. 23—1885, Oct.; b. Albany. At 9 years of age, he received a premium for a drawing at the Amer. Institute; at 15, he was pupil of Prof. Morse and at the National Acad., where he won a medal. For two years he studied theology at Amherst and Andover; but resumed art, painting portraits. While in Europe, 1849-60, he made excellent copies of Titian, and painted classical and scriptural pieces. He was pres. of the National Acad. 1871-73. Besides portraits of many eminent persons, his works include a Venus, an infant Bacchus, a Cupid, a Holy Family, *Moses and Aaron on Mount Horeb, Flight into Egypt, Ruth and Naomi*, and *Admiral Farragut at the Battle of Mobile Bay*—the last presented by purchase to the emperor of Russia. His ideal head of Christ, 1870, attracted much attention. From the study of a reputed death-mask of Shakespeare, he made, 1874-78, a bust and several portraits of the poet. He has been regarded as a remarkable colorist in the manner of Titian, whose secret he thought that he had discovered, and otherwise as an artist of rare merit. His versatility led him to invent improvements in boats and guns, and his theoretic tendency led him to conceive and publish (1860) a *New Method of Measuring the Human Figure*. Among his portraits are those of John Quincy Adams, the Brownings, Charlotte Cushman, and others, including a full-length likeness of Admiral Farragut, which was presented to the emperor of Russia. At times he lectured on art, and his conversational powers were unusual.

PAGEANT, n. *păj′ĕnt* [Gr. and L. *pēgma*, a kind of stage or scaffolding used in Roman amphitheatres: mid. L. *pagĭna*, a movable machine or scaffold for an exhibition, the exhibition itself]: a gorgeous or splendid show; anything intended for mere pomp or display; anything showy without stability: ADJ. showy; ostentatious; superficial. PAGEANTRY, n. *păj′ĕnt-rĭ*, ostentatious show or display.

PAGET, *păj′ĕt*, FAMILY OF: noble family in England, said to be of Norman extraction, but not tracing their descent further back than the reign of Henry VII., in whose time one William P. held the office of one of the sergeants-at-mace of the city of London. His son William P., who was educated at St. Paul's School and at Cambridge, was introduced into public life by Stephen Gardiner, bp. of Winchester, early in the reign of Henry VIII., who sent him abroad to obtain the opinions of foreign doctors as to the king's contemplated divorce from Catharine of Aragon. From this time forth, his rise was rapid, and he was constantly employed in diplomatic missions until the death of the king, who appointed him one of his executors. He then adhered to the party of the Protector Somerset, and was raised to the peerage 1552, as Lord Paget of Beaudesert. He shared in the power and in the fall of the Protector, and was heavily fined by the star chamber, and deprived of the insignia of the order of the Garter. His disgrace, however, was not of long continuance, and, a change taking place in the councils of his opponents, he soon obtained his pardon. On the accession of Queen Mary, he was sworn a member of the privy council, and obtained several large grants of lands. He retired from public life on the accession of Elizabeth, who regarded him with much favor, though he was a strict Rom. Catholic. The representative of the family adhered to the cause of Mary, Queen of Scots, and suffered, in consequence, the confiscation of his property. The fifth Lord P. so far departed from the traditionary policy of the family as to accept from the parliament the lord-lieutenancy of Buckinghamshire; but he returned to his old allegiance shortly afterward, and held the command of a regt. under the royal standard at the battle of Edgehill. His grandson was advanced to the earldom of Uxbridge, but, this title becoming extinct, the representation of the family devolved on a woman, who carried the barony of P. by marriage into the house of Bayly. The son of this marriage, however, having assumed the name Paget, obtained a renewal of the earldom of Uxbridge, and the second earl, for his gallantry at Waterloo, was advanced to the marquisate of Anglesey. Of late years, the P. family have usually held three or four seats in every parliament, and they have constantly supported the liberal party.

PAGINA, n. *pā′jĭ-nă*, PAGINÆ, n. plu. *pā′jĭ-nē* [L. *pāgĭna*, a page or leaf]: in *bot.*, the surface of a leaf; any flat surface

PAG'ING-MACHINE: machine for paging books and numbering bank-notes, checks, railway-tickets, and similar papers. The great object of such machines is to prevent the chance of error or fraud by making it impossible that a page, check, etc., can be abstracted or lost without detection. In an ingenious machine, perfected in London—the page numbers having been engraved on metal rowels, usually of steel or brass—a series of these rowels are so arranged that, when the machine is worked, the numbers must be impressed on the paper in regular succession from 1 to 99,999; and it is impossible to produce a duplicate number until the whole series has been printed. The instrument is made to supply ink to the types, so that it may be locked in such a manner as to admit of being worked without the chance of its being tampered with. An extremely ingenious modification of this machine, perfected by Auguste Trouillet of Paris, under the name 'Numérateur Mécanique,' is more simple, and admits of wider application; for it not only pages books and numbers notes, tickets, etc., but can be used also for numbering bales and packages of merchandise. The instrument has six rowels, on each of which is a set of engraved numbers, so arranged that their revolutions produce in regular succession the required numbers, by the action of a lever which moves horizontally, and supplies the type with ink as it moves forward and backward.

PAGO, *pā'gō:* island belonging to the Austrian crownland of Dalmatia, separated from Croatia by the Morlacca canal, a channel two to three m. wide. The island, parallel to the Croatian coast, is long and narrow, and has 108 sq. m. The people are most industrious, and support themselves by vine-culture, manufacture of salt, and fishing. Pop. 5,150.

PAGODA, n. *pă-gō'dă*, or PAGOD, n. *pā'gŏd* [Port. *pagao*, a pagan; *pagode*, an assembly of idolaters, a temple of the Indians—according to some, a corruption of the Sanskrit word *bhâgavata*, from *bhagavat*, sacred; according to others, a corruption of *put-gada*, from the Persian *put*, idol, and *gada*, house]: a Hindu temple containing an idol; the idol itself; a name applied by Europeans to numerous Indian gold coins. PAGODA-STONE, the name given in China to a limestone containing tapering fossil shells, so called because when cut and polished they appear as a tapering pagoda. PAGODITE, n. *pā'gō-dīt*, the stone which the Chinese carve into ornamental figures and pagodas; figure-stone.—*Pagoda* is the name of certain Hindu temples, which are among the most remarkable monuments of Hindu architecture. Though the word itself designates but the temple where the deity —especially S'iva and his consort Durgâ or Pârvatî—was worshipped, a P. is in reality an aggregate of various monuments, which, in their totality, constitute the holy place sacred to the god. Sanctuaries, porches, colonnades, gateways, walls, tanks, etc., are generally com-

bined for this purpose, according to a plan more or less uniform. Several series of walls form an inclosure; between them are allies, habitations for the priests, etc., and the interior is occupied by the temple itself, with buildings for the pilgrims, tanks, porticoes, and open colonnades. The walls have, at their openings, *gopuras*, or large pyramidal gateways, higher than themselves, and so constructed that the gopura of the outer wall is always higher than that of the succeeding inner wall, the P. itself being smaller than the smallest gopura. The extent of the inclosing walls is usually considerable; in most instances, they consist of colossal hewn stones placed upon one another without mortar or cement, but with such admirable accuracy that their joints are scarcely visible. The gateways are pyramidal buildings of most elaborate workmanship; they consist of several, sometimes as many as 15, stories. The pagodas themselves, too, are pyramidal, various layers of stones having been piled upon one another in successive recession; in some pagodas, however, the pyramidal form begins only with the higher stories, the broad basis extending to about a third of the height of the whole building. The sides of the different terraces are vertical; but the transition from one to the other is effected by a vault surmounted by a series of small cupolas, which hide the vault itself. A single cupola, hewn out of the stone, and surmounted by a globe, generally crowns the whole structure; but sometimes the latter also ends in fantastical spires of a fanlike shape or concave roofs. The pagodas are covered all over with the richest ornamentation. The pilasters and columns, prominent in the ornamental portion of these temples, show the greatest variety of forms; some pagodas are also overlaid with strips of copper having the appearance of gold. The most celebrated pagodas on the mainland of India are those of Mathura, Trichinopoli, Chalambron, Konjeveram, Jaggernaut, and Deogur, near Ellora.—That of Mathura consists of four stories, and is about 63 ft. high; its base comprises about 40 sq. ft. Its first story is of hewn stones, copper, and covered with gilt; the others are of brick. A great number of figures, especially representing deities, tigers, and elephants, cover the building.—The P. of Tanjore is the most beautiful monument of this kind in s. India; its height is 200 ft., and the width of its basis is equal to two-thirds of its height.—The P. of Trichinopoli is on a hill, about 300 ft. above the plain; it differs in style from other pagodas dedicated to Brahminical worship, and exhibits great similarity to the Buddhistic monuments of Tibet.—The great P. of Chalambron, in Tanjore, is one of the most famous and one of the most sacred of India: it is dedicated to S'iva and Pârvatî, and filled with representations pertaining to the mythical history of these gods. The buildings of which this P. is composed cover an oblong square, 360 ft. long, 210 ft. wide.—At Konjeveram are two pagodas—one dedicated to S'iva, the other to Pârvatî.—The pagodas of

Jaggernaut, on the n. end of the coast of Coromandel, are three; they are in honor of S'iva, and are surrounded by a wall of black stones—whence they are called by Europeans the Black Pagodas—measuring 1,122 ft. in length, 696 ft. in width, 24 ft. in height. The height of the principal of these three pagodas is said to be 344 ft.; according to some, however, it does not exceed 120–123 ft.—The P. of Deogur, near Ellora, also consists of three pagodas, sacred to S'iva; they have no sculptures, however, except a trident, the weapon of S'iva, which is visible on the top of one of these temples.—The monuments of Mavalipura, on the coast of Coromandel, are generally called the Seven Pagodas; but as these monuments—rather a whole city, than merely temples—are buildings cut out of the living rock, they belong properly to the rock-cut monuments of India, rather than to the special class of Indian architecture comprised under the term pagoda.

Porcelain Tower of Nanking.

The term P. is applied loosely also to those Chinese buildings, of tower-form, which consist of several stories, each story containing a single room, and surrounded by a gallery covered with a protruding roof. These buildings differ materially from the Hindu pagodas, not only in style and exterior appearance, but also in their design for other than religious purposes. The Chinese call them *Ta*, and they are erected usually in commemoration of a celebrated personage or some remarkable event; and for this reason, too, on some elevated spot, where they may be conspicuous, and add to the charms of the scenery. Some of these buildings have a height of 160 ft.; the finest known specimen of them is the famous Porcelain Tower of Nanking (q.v.). The application of the name P. to a Chinese temple should be discountenanced; for, as a rule, a Chinese temple is an insignificant building of wood, seldom more than two stories high; the exceptions are rare, and where they occur, as at Peking, such temples, however magnificent, have no architectural affinity with a Hindu pagoda.

PAGURIAN, n. *pă-gū'rĭ-ăn* [L. *păgūrus;* Gr. *pagouros*, a species of crab-fish]: the hermit crab, having the well-known habit of appropriating the deserted shells of whelks and other univalves for the protection of its defenseless abdomen. PAGURUS, n. *pă-gū'rŭs*, the systematic name of the tribe of crustaceans (*Paguridæ*) of which the hermit crab is the type: see HERMIT CRAB.

PAGUS, n. *pā′gŭs* [L. district, canton (see PAGAN)]: anciently, among the Romans, a stronghold or fortified place in which the inhabitants of a rural district took refuge in the event of a sudden invasion.—In the early history of the Teutonic peoples, P. designated an aggregation of inhabitants or a political division larger or more populous than a village (*vicus*). In England it was equivalent to *wapentake* or *hundred*.

PAHLANPUR, *pâl-an-pôr′*: town of India, cap. of the state of P., 260 m. e.s.e. of Hyderabad. It is a walled town, seat of extensive trade and of several manufactures. Pop. (1891) 21,100.

The *state* of P. is in the province of Guzerat, Bombay; 2,400 sq. m., and a pop. of 234,402; revenue of £40,000, paying annual tribute of £5,000 to the Guicowar, and £600 per annum for a British political agent. The ruling family is Moslem, the people mainly Hindus. The products are wheat, rice, sugar-cane and cotton. In the s. and e., three crops are obtained in the year.

The *P. agency* comprises P. and ten other states; 8,000 sq. m. Of the 11 states, 4 (including P.) are Mohammedan, the others Hindu; and five of the ruling families are Rajput.

PAHLAVI, *paw-law-vē′*, or PEHLEVI, *pā-lā-vē′* [Persian, *pahlavi*, valor, power; *Zabán Pehlevi* = Language of Heroes]: ancient West-Iranian (Median and Persian) idiom, in use chiefly during the period of the Sassanides (A.D. 235–640), who, wishing fully to restore the anc. Persian empire, endeavored also to reinstate the primitive national language, fallen into disuse as a court-language since the time of Alexander's conquest. Yet they chose not the pure Persian as it was still spoken in the interior, but the dialect of the w. provinces, largely mixed with Semitic words, to which Arian terminations were affixed. The grammatical structure of the P. presents almost the same poverty of inflections and terminations as the present Persian. Although less rich than Zend (q.v.) in inflection and accentuation, it yet has the same copiousness of words as that dialect, to which it in reality succeeded. It is written from right to left, and the letters are mostly joined. The remnants of P. extant consist of coins, inscriptions (found at Hajiabad, Persepolis, Kermanshah, etc.), and a number of books, all relating to the religion of Zoroaster. The most important of these are the translation of the chief part of the Zend-Avesta (Yazna, Visparad, and Vendidâd), and such original religious works as the Bundehesh, Shikand-gumâni, Dinkart, Atash Barâm, etc. The P. of the books differs from that of the inscriptions and coins to such a degree—according to the larger or smaller preponderance of the Semitic element—as to have misled investigators (Westergaard and others) to assume that two utterly distinct languages, a purely Iranic and a Semitic one, had been used somewhat indiscriminately

at the time. The non-Iranian element is called Huzvaresh (Huzooresh) by the Parsee priests, who, taking advantage of the ambiguity of the P. alphabet, often substitute the corresponding Persian for the foreign words. The Iranian part of the P. differs little from the Persian of our own day, and, in fact, the P. changed first into Parsee, and subsequently into modern Persian, simply by ridding itself first of its Chaldee, then of those of its Iranian, words which had become obsolete. The chief use of the P. dialect at present is the assistance that it offers toward the elucidation of the Zend itself. For the history of its investigation since it was first made known in Europe, see PERSIAN LANGUAGE AND LITERATURE.

PAID: see under PAY.

PAIDEUTICS, n. plu. *pī-dū′tĭks* [Gr. *paideutĭkos*, pertaining to instruction—from *paideu′ō*, I bring up a child—from *pais* or *paida*, a child]: science or theory of instruction; school management; the best methods of instructing children.

PAIGLE, n. *pā′gl*, or PAGIL, *pā′jĭl* [F. *épingle*, a pin, from the likeness of the style and stigma to a pin stuck in the germ—from mid. L. *spin′ula*, a little thorn]: the cowslip.

PAIL, n. *pāl* [W. *paeol*, a pail or pot: OF. *pœle*, a pot, a pail: Gr. *pella*, a milk-pail: It. *padella*, a pan: Sp. *paila*, a basin]: an open vessel with a moving handle attached to the rim in two places, used for carrying liquids. PAILFUL, n. *pāl′fûl*, the quantity that a pail will hold; plu. PAILFULS. MILK-PAIL, a pail for carrying milk.

PAILA: according to the Purân′as (q.v.), one of the disciples of Vyâsa (q.v.), the reputed arranger of the Vedas (q.v.): he was taught by the latter the R′igveda, and, on his part, communicated this knowledge to Bâshkali and Indrapramati. This tradition, therefore, implies that P. was one of the earliest compilers of the R′igveda.

PAILLASSE, n. *păl-yăs′* [F. *paillasse*, a straw-bed—from *paille*, straw]: an under mattress of straw—also spelled PALLIASSE. PAILLASSON, *pă-lyă-sawng′*, kind of straw bonnet for women, introduced about 1850.

PAILLETTES, n. plu. *pâ′ĭ-ĕtz′* [F.—from *paille*, straw, chaff—from L. *palĕă*, chaff]: small disks of metal, pierced in the middle, for attaching to stuffs and dresses, for the purposes of ornament; spangles. PAILLONS, n. plu. *pâ′ĭ-ŏnz* [F. *paillons*, spangles]: small leaves of very thin-beaten copper, colored, and used for ornamental purposes on theatrical dresses, or as backing for precious stones.

PAIN.

PAIN, n. *pān* [F. *peine*, pain, penalty: Dut. *pijne;* Ger. *pein*, pain, trouble: W. *poen;* Gael. *pian*, pain, punishment: Icel. *pina*, to torment, to punish: L. *pœna;* Gr. *poinē*, penalty, punishment]: sensation of uneasiness, distress, or torture in animals, resulting from injury to the body or derangement of its functions (see below): uneasiness of mind; mental suffering; penalty; punishment denounced or suffered: V. to torture; to distress; to render uneasy in body or mind; to trouble; to grieve. PAINS, n. plu. *pānz*, work; toil; laborious or diligent effort; the throes of travail. PAIN'ING, imp. PAINED, pp. *pānd*. PAIN'FUL, a. *-fûl*, giving or causing pain; miserable; laborious. PAIN'FULLY, ad. *-lĭ*. PAIN'FULNESS, n. *nĕs*, the quality or condition of being painful. PAIN'LESS, a. *-lĕs*, free from pain. PAIN'LESSLY, ad. *-lĭ*. PAIN'LESSNESS, n. *-nĕs*, the state or quality of being without pain. PAINSTAKING, a. *pānz'tā'kĭng* [*pains*, and *taking*]: carefully industrious; laborious: n. careful and conscientious exertion. PAINS'TAKER, n. one who takes pains. SYN. of 'pain, n.': suffering; agony; anguish; pang; evil; distress; uneasiness; disquietude; anxiety; grief; solicitude; effort; task; work; toil; trouble;—of 'pain, v.': to afflict; disquiet; aggrieve; torment; agonize; torture;—of 'painful': distressing; difficult; arduous; disquieting; troublesome; afflictive; grievous; toilsome.

PAIN: undefinable sensation, of the nature of which all persons are conscious. It resides exclusively in the nervous system, but may originate from various sources. Irritation, or excessive excitement of the nervous system, may produce it; it frequently precedes and accompanies inflammation; while it sometimes occurs in, and seems to be favored by, a state of positive depression, as in the intense pain often experienced in a limb benumbed with cold, in the pain which not unfrequently accompanies palsy, and in the well-known fact that neuralgia is a common result of general debility. Hence, pain must on no account be regarded as a certain indication of inflammation, though it rarely happens that pain is not felt at some period or other in inflammatory diseases.

Pain varies not only in its character, which may be dull, sharp, aching, tearing, gnawing, stabbing, etc., but in its mode of occurrence—e.g., it may be flying or persistent, intermittent, remittent, or continued. It is not always that the pain is felt in the spot where its cause exists. Thus, inflammation of the liver or diaphragm may cause pain in the right shoulder; the irritation caused by a stone in the bladder produces pain at the outlet of the urinary passage; disease of the hip-joint occasions pain in the knee; disease of the heart is often accompanied with pain in the left arm; and irritation of the stomach often gives rise to headache. Pain is differently felt by persons of different constitutions and temperaments, some persons being little sensitive to

painful impression of any kind, while others suffer greatly from slight causes. There seem to be even racial differences in this respect.

Although in most cases pain is to be regarded as merely a symptom to be removed only by means which remove the lesion which occasions it, there are cases in which, though it is only a symptom, it constitutes a chief element of disease, and one against which remedies must be specially directed.

The word Pain has a looser use, in which, as the antithesis of pleasure (q.v.), it refers to any unpleasant experience; but it has also a specific use, in which it means a definite sort of sensation. There are, however, several distinguishable types of painful sensation: as toothache, aching in the bones, pricking in the skin. Pain was formerly thought to result from excessive stimulation of any sense organ; but it has been shown that the pricking sensation, at least, arises from the stimulation of a special sense organ in the skin. If the skin be explored with a fine instrument, pain can be aroused only at certain spots, called the 'pain points'; other spots, which give sensations of warmth, cold or touch, cannot be made to give the sensation of pain. There are certain areas, such as the cornea of the eye, which give little or no sensation except pain; there are other areas, such as some parts of the inside of the cheek, which give no pain. The sense organ which gives pain seems to be a diffuse branching of a nerve fiber in the skin; it is less specialized than the organs of any other sense, and the pain sense is probably the most primitive of all the senses. Unlike other sense organs, it responds to stimuli of various sorts—mechanical, thermal, chemical—in fact, to any stimulus which is sufficiently intense to harm the skin. Excitation of a pain nerve arouses a movement of escape or of defense, and this even in animals which, having been deprived of the brain, are probably unconscious of the pain. In nervous diseases, it sometimes occurs that the pain sense is lost, though the other skin senses are retained—a condition known as analgesia. Excessive sensitiveness of the pain sense—hyperalgesia—is also found.

For the methods of relieving pain, see the titles of the different diseases in which it specially occurs—e.g., Colic; Neuralgia; Pleurisy; etc.; see also Chloroform; Ether; Morphia; Narcotic; Opium; etc.

PAINE, *pān*, Albert Bigelow: American author: b. New Bedford, Mass., 1861, July 10. He was educated in the public schools of Xenia, Ill.; was editor of the juvenile department of the New York *Herald*, and since 1899 has been editor of the League department on *St. Nicholas Magazine*. He has published: *The Mystery of Eveline Delorme* (1894); *The Hollow Tree* (1898); *The Deep Woods* (1899); *The Great White Way* (1901); *The Van Dwellers* (1901); *The Wanderings of Joe and Little Em* (1903); *The Commuters* (1904); *Nast—His*

Period and His Pictures (1904); *A Little Garden Calendar* (1905); *A Sailor of Fortune* (1906); *From Van Dweller to Commuter* (1907); etc.

PAINE, Elijah, ll.d.: 1757, Jan. 21—1842, Apr. 28; b. Brooklyn, Conn. He graduated from Harvard 1781, and after studying law removed to Vermont, and commenced practice. He was prominent in the revision of the state constitution 1786, member of the legislature 1787-91, supreme-court judge 1791-95, member of the U. S. senate 1795-1801, and a U. S. district judge from the latter year till his death. He did much to develop agriculture and manufactures in Vermont, was one of the first American manufacturers of woolen cloth, was a member of several learned societies, and a liberal supporter of educational institutions.

PAINE, Halbert Eleazar: American lawyer and soldier: b. Chardon, Ohio, 1826, Feb. 4; d. 1905, April 15. He was graduated from Western Reserve University, Ohio, in 1845, and practiced law in Cleveland until 1857, when he removed to Milwaukee, Wis. He enlisted in the Union army at the outbreak of the Civil War, and was commissioned colonel, from which rank he rose to be brigadier-general. At Fort Hudson in 1863, where he commanded the third division, he lost a leg, and in 1864 he was discharged with the rank of brevet major-general. He was a member of Congress 1865-71, and in 1888 was appointed commissioner of patents. He published *Paine on Elections* (1888).

PAINE, John Knowles: American organist and composer: b. Portland, Maine, 1839, Jan. 9; d. Cambridge, Mass., 1906, April 25. In 1858-61 he studied in Germany, in 1862-73 was instructor in music at Harvard, and in 1875 became professor of music there. He composed the music for the *Œdipus Tyrannus* of Sophocles, as performed in the original at Cambridge in 1881; the *Centennial Hymn* to Whittier's words for the Exhibition at Philadelphia in 1876, and the Columbus march and hymn for the World's Columbian Exposition of 1893. Among his further works are: the opera *Azara; Spring Symphony;* the cantatas, *The Nativity* and *The Song of Promise;* choruses to Aristophanes' *Birds;* symphonic poems; music to the *Tempest;* and an overture to *As You Like It.*

PAINE, Levi Leonard, d.d.: American theologian: b. Holbrook, Mass., 1832, Oct. 10; d. Bangor, Maine, 1902, May 10. He was graduated from Yale in 1856 and from Yale Divinity School in 1861. He then entered the Congregational ministry and was pastor at Farmington, Maine, 1861-69. In 1870 he became professor of ecclesiastical history in Bangor Theological Seminary and held that post until his death. He was the author of an important work entitled *A Critical History of the Evolution of Trinitarianism and Its Outcome in the New Christology* (1900).

PAINE, *pān*, Robert Treat, ll.d.: 1731, Mar. 11—1814, May 11; b. Boston. He graduated from Harvard 1749, made a business trip to Europe, studied theology, and 1755 became chaplain of the colonial troops near Canada. He afterward occasionally supplied various pulpits in and near Boston; taught school to obtain means for studying law; and 1759 commenced practice at Boston, but removed to Taunton. The attorney-general being absent, P. managed the prosecution of Capt. Preston and his company, for the massacre at Boston 1770; was a member of the Mass. general assembly, of the provincial congress 1774–5, and of the continental congress 1774–78. He was one of the signers of the Declaration of Independence, was a member of the Mass. constitutional convention, atty.gen. 10 years from 1780, and supreme-court judge 1790–1804, resigning in the latter year. He was one of the founders of the American Acad. of Arts and Sciences. He died in Boston.

PAINE, Robert Treat, Jr.: 1773, Dec. 9—1811, Nov. 13; b. Taunton, Mass. He was named Thomas, but, to avoid being confused with the famous deist, secured permission 1801 from the legislature to change his name to Robert Treat. He graduated from Harvard 1792, published the *Federal Orrery* semi-weekly 1794, became 'master of ceremonies' at the Federal Theatre, and married an actress. The personalities in his paper and his connection with the stage brought him into disrepute with good society. He studied law, practiced with Theophilus Parsons in Boston 1802, but the following year resumed his theatrical associations. His last years were far from prosperous. His principal literary productions were two poems, *The Invention of Letters* (1795) and *The Ruling Passion* (1797); and a song, *Adams and Liberty* (1798). His writings, with a *Memoir* by Charles Prentiss, were published 1812. He died in Boston.

PAINE, Thomas: author famous for his connection with the American and French revolutions, and for his advocacy of infidel opinions: 1737, Jan. 29—1809, June 8; b. Thetford, county of Norfolk, England. He was trained to the business of his father, who was a Quaker staymaker, but afterward obtained a situation in the customs, and the management of a tobacco-manufactory. His income, however, was small, and he fell into debt, and was dismissed 1774. He went to America, was favorably received by a bookseller in Philadelphia, and 1776 published a pamphlet entitled *Common Sense*, written in popular style, in which he maintained the cause of the colonies against the mother country. The success and influence of this publication were extraordinary, and it won him the friendship of Washington, Franklin, and other distinguished American leaders. It doubtless turned the popular mind at that critical point in the struggle; but the assertion sometimes made that P. was

author of the original draft of the Declaration of Independence is without proof. After peace was declared, P.—in view of his patriotic services and sacrifices—was rewarded by congress with $3,000 and the appointment of sec. to the committee of foreign affairs, and by the state of N. Y. with a large farm in Westchester co. He visited France in the summer of 1787, where he made the acquaintance of Buffon, Malesherbes, La Rochefoucauld, and other eminent men; and, in the autumn following, went to England, where, 1791, he published *The Rights of Man*, the most famous of all the replies to Burke's *Reflections upon the French Revolution*. The work has gone through innumerable editions, and has been translated into almost all the languages of Europe. His defense of the principles of the French Revolution, against the magnificent assault of Burke and the outcry of the English aristocracy, is vigorous, and not unsuccessful. But the value and the popularity of the work have been injured by its advocacy of extreme liberal opinions. His assaults on the British constitution exposed him to a government prosecution, and he fled to France, where he was admitted to citizenship; and 1792 the dept. of Pas-de-Calais elected him a deputy to the national convention, where he voted with the Girondists. At the trial of Louis XVI., says Madame de Staël, 'Thomas Paine alone proposed what would have done honor to France if it had been accepted—the offer to the king of an asylum in America,' by which he offended the Mountain party; and 1793 Robespierre caused him to be ejected from the convention, on the ground of his being a foreigner, and thrown into prison. Before his imprisonment, he wrote part of *The Age of Reason*, against Atheism and Christianity, and in favor of Deism. After an imprisonment of 14 months, he was released, on the intercession of the American govt., and restored to his seat in the convention. He was chosen by Napoleon to introduce a popular form of govt. into Britain, after the Frenchman should have invaded and conquered the island. But as Napoleon did not carry out his design, P. was deprived of an opportunity of playing the part of legislator for his conquered countrymen. He then retired into private life, and occupied himself with the study of finance. In 1802 he returned to the United States, and died at New Rochelle, N. Y. His admirer, the radical William Cobbett, removed P.'s bones to England a few years later; and it is believed that they were afterward removed to France.

P. was an 18th-c. deist, disbelieving in revealed religion, but a strong believer in the existence of a God, and with high estimate of Christain virtues. His *Rights of Man* is written with considerable dignity and force; his *Age of Reason*, produced after his arrest and before his imprisonment in France, is not only feeble, compared with recent attacks on the Christian Scriptures, but is also coarse, scurrilous, and passionate. Benjamin Franklin advised him to 'burn it before it was seen

by any other person.' P., though of an impulsive nature, arrogant, improvident, irregular in life, and lacking self-control—and in his last years falling under the vice of intemperance, as is usually believed—was not without kindliness and generosity. Separated from his wife, and without children or kindred in this country, his last years were clouded. His coarse and ignorant attack on Christianity has doubtless dimmed his rightful lustre as a defender of human rights. The most complete ed. of his works is by J. P. Mendum (Bost. 1856); the most noted of his numerous biographers is William Cobbett (1796).

PAINESVILLE, *pānz'vĭl:* vill., cap. Lake co., O.; on the Lake Shore, New York, Chicago and St. Louis, the Pittsburg and Western, and the Lake Shore and Michigan Southern railroads, and on the Grand river; 29 m. from Cleveland. The river is deep and wide, furnishing an excellent harbor only 3 m. from Fairport, on Lake Erie. P. is in a fertile agricultural region. There are extensive deposits of fire-clay in the vicinity. The industries of P. include the making of veneering machinery, foundry products, bricks, flour, sashes and blinds, and hardware specialties. Floriculture is an important feature, there being several large nurseries in and near the village. P. has excellent public schools, a public library, several churches and banks. There is good dock accommodation for shipping of ore. The electric-light and water-supply plants are owned and operated by the municipality. Pop. (1910) 5,501.

PAINS AND PENALTIES: in Eng. history, a species of process employed to punish state offenders out of the ordinary course of justice. When a person has committed some crime of peculiar enormity, for which no adequate punishment is provided by the ordinary law, the mode of proceeding is by introducing into parliament a bill of pains and penalties, involving a punishment extraordinary and anomalous. These bills are now seldom resorted to, and the latest attempt to revive this form of process was by the ministers of George IV. against Queen Caroline, 1820, an attempt which was signally defeated.

PAINT, n. *pānt* [F. *peindre,* to paint: OF. *paint,* painted—from L. *pictus,* painted: Sp. *pintar,* to paint]: a coloring substance; a pigment (see PAINTS): V. to represent by colors or images; to cover with a color or colors; to represent to the mind; to describe; to lay colors on the face. PAINTING, imp. *pānt'ĭng:* N. the art of laying on colors, or of representing objects by delineations and colors; a picture; a painted resemblance (see below). PAINT'ED, pp. PAINT'ER, n. *-ẽr,* one who paints (see PAINTING, below). PAINTERS' COLIC, a disease, terminating in palsy and mental imbecility, peculiar to painters and workers in lead (see LEAD-POISONING). PAINTER'S CREAM, composition used by artists to cover oil-paintings

in progress, when they temporarily quit their work; it prevents drying, and the consequent showing of lines where new work is begun. It consists of six parts of fine nut-oil and one part of gum-mastic. The mastic is dissolved in the oil, and then is added a quarter part of acetate, or sugar of lead, finely triturated with a few drops of the oil. When all these substances are well incorporated, water must be added, and thoroughly mixed, until the whole has the consistency of cream. It is applied with a soft brush, and can easily be removed with water and a sponge. PAINTER-STAINER, a painter of coats of arms. HOUSE-PAINTING (see PAINTING, HOUSE). ASBESTOS PAINT, *ăs-bĕs'tŏs*, ground asbestos mixed with coloring matters and oils; used for covering interior woodwork, which the asbestos body renders to some extent fireproof, and for coating roofs, as a protection against sparks. LUMINOUS PAINT, phosphorescent substance used as a coating for surfaces. The phenomenon of phosphorescence, which gives to L. P. its distinctive character, has nothing to do with phosphorus, whose luminosity is due to slow oxidation. The first discovery of a substance emitting light without oxidation belongs to the early part of the 17th c., when sulphide of barium (Bologna stone) and chloride of calcium (Homberg's phosphorus) were discovered. Sulphide of calcium dates from 1768; sulphide of strontium is the latest discovery in this kind. Any of these substances, if inclosed in a sealed glass tube and exposed to sunlight, and then carried into a dark room. appears at first brilliantly luminous, and long afterward like a hot body cooling. Practical application has been made of the property in the production of L. P., the above compounds being ground and mixed with a vehicle, as in ordinary paint, and laid on the surface that is to be made luminous.—SYN. of 'paint, v.': to color; draw; sketch; depict; picture; delineate; portray; diversify; represent; adorn; image.

PAINTER, n. *pānt'ėr* [OF. *pantiere*, a kind of snare for birds: It. *pantiera*, a fowling-net, a trammel: L. *panther*, a net for wild beasts: comp. Gael. *painntear;* Ir. *painteir*, a gin, a snare]: a rope used to fasten a boat to a ship or other object.

PAINTER, *pānt'ėr*, GAMALIEL: 1743, May 22—1819, May 21; b. New Haven, Conn. He was educated in the common schools; when a young man, removed to Vt., and 1773 built the first house in what is now the town of Middlebury. In the war of the revolution, he was captain of a company, and afterward a quartermaster; he was a member of the convention 1777 which proclaimed Vt. an independent state; represented his district in the legislature; and was appointed one of the county-court judges. He was a member of the first convention to draft a state constitution 1793, and was a councilor 1813–4. He was one of the leading founders of Middlebury College, and in his will gave it $10,000. He died at Middlebury.

PAINTING.

PAINTING, Anterior to the Renaissance: Painting literally is to apply a mixture, called paint or color, upon any surface desired to be colored. But as one of the fine arts—in which it occupies a prominent place, some competent critics claiming for it the first place, as combining the chief elements, namely form, light and shade, and color,—painting is the art of applying colors on a flat surface, by the aid of drawing and design, so as to form figures that will present objects to the eye in such a manner as to produce the appearance of natural objects. Compared, however, with music and poetry, it lacks the important element of movement, the representation being confined largely to one aspect and one instant of time. In its ruder and more elementary forms, in which the primary design was to communicate ideas, painting is next to the oldest of the arts, modeling in the round being the earliest development of the imitative arts. It is older, however, than writing (see Alphabet; Hieroglyphics); and, as a vehicle of knowledge, it possesses this advantage over writing—that no *description*, however minute, can convey so accurate and distinct an idea of an object as a plastic or pictorial representation, much less make so vivid an impression. Besides this, it is not limited, as writing is, by differences of language, but speaks alike to all nations and all ages.

The great antiquity of painting is proved by remains discovered in Egypt, and by reference to it in ancient writings. It has been ascertained that as early as B.C. 19th c., the walls and temples of Thebes were decorated by painting and sculpture. Ezekiel, who prophesied about B.C. 598, refers to paintings in Jerusalem after the manner of the Babylonians and Chaldeans. Though no specimens have come down to us, it is evident that paintings of the highest excellence were executed in Greece. This is proved by what is recorded of them; for the subjects of many of those mentioned required the putting forth in a high degree of all the qualities requisite for the production of the greatest historical works, such as form, grouping, expression, foreshortening. From the immense sums given for paintings, the care with which they were preserved in temples and other public buildings, and from the fact of the high state of sculpture at contemporary periods, as proved by well-known works extant, it may be deduced that painting, which, like sculpture, is based on design or drawing, must have occupied an equally high position. Even the imperfect specimens discovered in Pompeii, where the style and influence of Greek art may be traced to some extent, lead to conclusions favorable to the high position of painting in classic times. The chief schools of painting in Greece were those of Sicyon, Corinth, Athens, and Rhodes. The first great artist of whose works there is any authentic description, and from details of which an idea may be formed of his attainments, is Polygnotus of Thasos (B.C. 420), who painted, among other works, those in the Pœcile, a cele-

brated portico at Athens, and the Lesche, or public hall at Delphi.

The works of Apollodorus of Athens (B.C. 408) are described and highly praised by Pliny. Zeuxis, pupil of Apollodorus, Eupompus, Androcides, Parrhasius the Ephesian, and Timanthes of Sicyon, prosecuted painting with distinguished success; and by them it was carried down to the time of Philip, father of Alexander. Of the same period was Pamphilus, celebrated not only for his works, but as the master of the artist universally acknowledged as the greatest of ancient painters, Apelles (q.v.), who was born probably at Colophon, and lived in the latter half of B.C. 4th c. He was highly esteemed by Alexander the Great, and executed many important works for that monarch. Protogenes of Rhodes was a contemporary, and may be styled the rival of Apelles, who greatly admired his works. His picture of Ialysus the hunter and the nymph Rhodos was preserved for many years in the Temple of Peace at Rome. Art in Greece had then reached its highest point; its course thereafter was downward.

In Italy art was followed at a very early period by the Etruscans, and, according to Pliny, painting, as well as sculpture, was successfully practiced in Ardea and Lanuvium, cities of Latium, perhaps more ancient than Rome. The finest specimens of Etruscan art, however—as the paintings on tombs, and the remains of armor and fictile ware ornamented with figures, evince unmistakably the influence of, or rather are identical with Greek art. According to Pliny, it was introduced from Corinth about B.C. 650. No great national school of painting ever flourished in Rome, for though the names of Romans who were painters are cited, the principal works of art that adorned the temples and palaces of Rome were obtained from Greece, and it is probable that many of the paintings executed there were by Greek artists. When the seat of empire was transferred to the East, such art as then remained was carried with it, and in a new phase was afterward recognized as Byzantine art—a conventional style, in which certain typical forms were adopted and continually repeated. This mode has been preserved, and is practiced in church-painting in Russia at the present day.

Much discussion has arisen in modern times as to the supposed technical modes or processes of painting employed by the ancients. It seems established that painting in fresco was much practiced; but many of the most valuable pictures of which we read were removable, and there are accounts of some carried from Greece to Rome. 'The Greeks preferred movable pictures, which could be taken away in case of fire' (*Wilkinson on Egyptian and Greek Paintings*), and Pliny says Apelles never painted on walls; besides fresco paintings on walls, therefore, there can be no doubt that the ancients painted on boards; indeed, the name *Tabula* or *Tabula picta* proves this, and it seems now generally acknowledged that these

were executed in tempera—that is, with size, and probably fixed or protected by some kind of varnish, in the preparation of which oil was used; or in encaustic, a process in which wax was employed to fix and give brilliancy and depth to the colors, heat being applied in working with it.

Painting was revived in Europe in the 13th c.; previous to that period, Byzantine artists chiefly were employed. On the conquest of Constantinople by the Latins 1204, the Byzantine school was broken up, and many Greek artists were transplanted to Italy, where art was then destined to flourish, so the works of the Italians, who profited by their instructions, were necessarily, at the commencement, composed in the Byzantine style. The first Italian whose name is associated with the revival of Italian art is Guido of Siena; a work by him, a large Madonna, inscribed with his name and the date 1221, is still preserved in that city, although the date is considered questionable. The next is Giunto da Pisa (1202-1258), whose work, though still constrained in design, made marked advance beyond Byzantine conventionality. But Giovanni Cimabue (1240-1300), is commonly styled the founder of the Italian school. Several works of considerable importance are ascribed to him; and though he followed the Byzantine arrangement, he ventured occasionally out of the path, introduced the study of nature in his drawing, and imparted a greater degree of softness to his painting than the Byzantine artists. The influence of Byzantine art was not confined to Italy; it operated in Germany, Bohemia, and France; but there also art began to assume a national character early in the 13th c., and paintings are still preserved at Cologne, dated 1224. The Italian school of painting, or that style in which so many of the highest qualities of art have been so successfully carried out, received its chief impetus from Giotto, son of Bordone, b. between 1265 and 1270, at Vespignano, near Florence, where he d. 1337. It is said that he was originally a shepherd-boy, and being discovered by Cimabue drawing a sheep on a slate, was instructed by him in painting. His style is distinguished from that of earlier painters by the introduction of natural incidents and impressions, by greater richness and variety of composition, by the dramatic interest of his groups, and by total disregard of the typical forms and conventional style of his predecessors. His influence was not confined to Florence, but extended over the whole of Italy; and works by this artist may be traced from Padua to Naples. Giotto followed Pope Clement V. to Avignon, and is said to have executed many important pictures there, and in other cities in France. The most celebrated of his frescoes extant are those at Assisi; some noted works by him in that class also remain at Padua, Florence, and Naples. Most of the small easel-pictures ascribed to him are of doubtful authenticity, but some preserved in the gallery at Florence are acknowledged genuine. His high powers

as sculptor and architect also are exemplified by works in that city. Giotto had numerous scholars and imitators, and several of these have left works which show that while they profited by his instruction or example, they were also gifted with original talent. Among these were Taddeo Gaddi, favorite pupil of Giotto (b. 1300, living in 1352); Simone Memmi (1284-1344); and Andrea Orcagna (1329-89), one of the artists employed in the decoration of the celebrated Campo Santo at Pisa. Painting in Italy continued to be impressed with the feeling and style of Giotto for more than a hundred years; but early in the 15th c., the frescoes executed by Masaccio (1401-1427) in the Brancacci Chapel in the Carmelite Church at Florence, clearly prove that it had entered on a new phase, and had come forth strengthened by an important element in which it had been deficient, viz., correct delineation of form, guided by the study of nature. These celebrated frescoes, 12 in number, were all at one time ascribed to Masaccio; but it seems now acknowledged that two of these are by Masolino da Panicale (1378-1415), the master of Masaccio; and three, or probably four, and a small portion of one, by his pupil, Fra Filippino Lippi (1406-1469). The frescoes by Masaccio, however, are superior to those by Masolino and Lippi; and, indeed, for many of the highest qualities in art, have, as compositions, been surpassed only by Raphael in his celebrated cartoons. In about a century from Masaccio's time, painting in Italy attained its highest development; but before referring to those artists who are acknowledged as having carried painting to the highest elevation which it has attained since the middle ages, it is right to note the names of some of the painters who aided in raising it to that position. The works of Fra Giovanni da Fiesole (1387-1455), called Fra Angelico, who has been aptly termed 'the last disciple of Giotto and the first harbinger of Raphael,' are highly valued and esteemed by many critics as the purest in point of style and feeling, and so the best fitted for devotional purposes. Confining his efforts to simple and graceful action, and sweet and tender expression, he adhered to the traditional types, and ventured on none of the bold innovations which were introduced in his time, and carried so far by Masaccio. His example, as regards feeling and expression, influenced many succeeding artists, particularly Benozzo Gozzoli (1420-1498), who worked with Fra Angelico on the Vatican chapel in Rome and to whom belongs the glory of having restored the episodic element to a lofty position in art, and Pietro Perugino, the master of Raphael (1446-1524), by both of whom these qualities, united to greatly improved technical power, were brought to high excellence. Giovanni Bellini (1428-1516) founder of the early Venetian school and considered the greatest painter produced by Italy in the 15th century, belonging, however, more to the latter than the earlier half of the century, has left many admirable works; he had numerous scholars,

among them Titian and Giorgione. Domenico Corradi or Ghirlandajo, under whom Michael Angelo studied, successfully followed out that direction given to art by Masaccio, which involved individuality of character and expression in the figures. Andrea Mantegna (1431-1506) of the school of Padua, with strong expression, gave an impetus to form, modelled on Greek or classic art. Luca Signorelli of Cortona (about 1440-1521), successfully exemplified powerful action and bold foreshortening, particularly in his frescoes at Orvieto, which, with his other works, are supposed to have strongly influenced the style of Michael Angelo. Contemporary with Fra Angelico and Fra Lippi was Domenico de Bartolommeo Veneziano (d. 1461), who it is certain used linseed oil as a medium for mixing his colors. But it is Antonello da Messina (1424-1493) who introduced oil painting into Italy. At Naples he saw a painting by Jan Van Eyck, which so enthused him that he went at once to Flanders, not, as is commonly stated, to become a pupil of Van Eyck, he having been dead some years, but to study the works of that master and become acquainted with his disciples. He returned to Italy about 1465 and introduced the new method, which created a great sensation among the painters of Venice. He was undoubtedly the first Italian to practice Van Eyck's method of painting in oil colors. He was an eminent colorist and his tones are so warm, clear, and bright, that he almost surpasses Van Eyck. The exact period at which oil-painting was practiced is, however, attended with much doubt. Painting with colors mixed in oil is mentioned by Italian writers before the period of Van Eyck; painting in tempera, or size, was continued in Italy, particularly in the Florentine and Roman schools, to the time of Raphael; and the transition from one method to the other has been so gradual, that many judges of art have expressed inability to determine whether the pictures of Perugino, Francia, and Raphael are in oil or tempera, or in both. The practice of painting on canvas, in place of wooden boards or panels, was introduced and carried on for a considerable time in Venice before it was adopted in other parts of Italy, and canvas is the material best suited for pictures in oil-colors when they are not of small dimensions; so, on the whole, the conclusion seems to be, that though oil-painting was not unknown in Florence and s. Italy, painting in tempera was practiced there longer than in Venice. At the date of the painters above referred to, there were many able artists in Germany, whose works are very highly prized. Among these, Hubert (1366-1426) and Jan Van Eyck (1382-1441) deserve special notice. To these brothers is due the sudden and mature development of painting in Flanders in the 15th century and there seems to be little or no doubt that to them or to Jan particularly is due the invention of painting in oil-colors as we understand it today. Jan Van Eyck's works are remarkable for brilliant and transparent coloring and high finish, showing plainly

the influence of the school of miniaturists. He had numerous contemporary followers who may have been pupils, among them, Roger Van der Weyden (1400-1464), Hugo Van der Goes (1405-1482), Justus of Ghent (1410-1480), and Hans Memlinc (1430-1494) the most eminent of the Van Eyck school. The leading qualities in German art are invention, individuality of character, clearness of coloring, and high finish; but they are inferior to the Italians in embodying beauty: their representation of the nude is angular in form and deficient in elegance and grace; and in their draperies they do not attain the simplicity and grandeur of their southern competitors.

Neither France, Spain nor Britain can boast of any artistic growth anterior to the Renaissance that has left a single mark upon the surface, and to that glorious period of the world's æsthetic development we must turn to read of the successors of the primitives. See RENAISSANCE PAINTING; POST-RENAISSANCE PAINTING.

See *History of Painting, Ancient, Early Christian, and Mediæval*, from the German of Woltmann and Woermann, edited by Sidney Colvin (1891); *Classic Painting*, by Poynter and Head (1880); and the standard works of Vasari (Florence 1568); Borghini (Florence 1584); Rodolphi (Venice 1648); Zanetti (Venice 1771); Lanzi (1792); Bohn's edition of Roscoe's translation; Von Rumohr (Berlin 1827); Kugler's *Hand-book of Painting, Italian Schools* (ed. by Eastlake 1855), *German, Flemish, and Dutch Schools* (1846), *Spanish and French Schools* (1848); *History of Painting in Italy*, by Crowe and Cavalcaselle (1876); *Hand-book for Young Painters*, by C. R. Leslie, R.A. (1855); Ruskin's *Modern Painters* (1843-1860); *Histoire de l'Art dans l'Antiquité* (1882-1904); Maspero, *L'Archéologie Egyptienne;* Girard, *La Peinture Antique* (1895); Prisse d'Avennes, *Histoire de l'Art Egyptien;* Crowninshield, *Mural Painting;* Collignon, *Manuel d'Archéologie Grecque;* Martha, *L'Archéologie Etrusque et Romaine, L'Art Etrusque;* Brunn, *Geschichte der griechischen Künstler* (1889); Milligen, *Peintures antiques et inédites de vases grecques;* Lau, *Die griechischen Vasen;* Mau, *Pompeii, its Life and Art;* Muther, *Geschichte der Malerei;* Bayet, *L'Art Byzantin;* Pératré, *L'archéologie Chrétienne;* Wornum, *The Epochs of Painting; Histoire de l'art du Japon. Ouvrage publié par la Commission Imperiale du Japon a l'Exposition Universelle de Paris* (1900); Anderson, *The Pictorial Arts of Japan* (1886); Gonse, *L'Art Japonais;* Paléologue, *L'Art Chinois;* Kakasu Okakura, *The Ideals of the East, with Special Reference to the Arts of Japan* (1903); Lassen, *Indische Alterthum Kunde;* Schnaase, *Geschichte der Kunst in Alterthum* (1874); *Grande Encyclopedie*, articles *Inde, Hindouisme* (1893); Maindron, *L'Art Indien;* Gayet, *L'Art Persan* (Librairies-Imprimeries Reunies, 1895); De la Marche, *Les Manuscrits et la Miniature;* Blanc, *Histoire des Peintres de toutes les ecoles.*

PAINTS.

PAINTS, or PAINTERS' COLORS, or PIGMENTS: prepared or unprepared compositions by which wood, stone, and other materials are coated with a preservative surface of oil, mixed with an earthy matter, to give it color and consistency; also the materials used by artists to produce the colored surfaces of their pictures. The art of Painting (q.v.), in its primitive state, consisted merely in applying such natural, mineral, and vegetable colors as were spontaneously yielded, without any vehicle to render them permanent; consequently, they had to be renewed as often as they were rubbed or washed off from the surfaces to which they were applied. The paints now in use are nearly all mixed with a liquid vehicle, and are applied in the liquid state. The mixing materials are varied according to the requirements of the work. Thus, for some kinds of decorative work and for water-color drawings, gum, glue, size, or other adhesive materials, dissolved in water, are employed; while for the painting of buildings, etc., and for oil-paintings, oils of various kinds are used for mixing and thinning the colors.—See PAINTING, HOUSE. Thus, for painted work exposed to the weather, it is found that linseed oil boiled with the sulphates of lead (litharge) or zinc, or with acetate of lead (sugar of lead), is the best. The preparation of boiled oil requires particular care, as it is desirable to have it bright and clear. Hence the proportions of the metallic salts are much varied by different manufacturers, and some add various other ingredients. The time of boiling, and the method of filtering, also are much varied. For indoor work, plain linseed oil and oil (spirit) of turpentine are used; if a *glossy surface* is wished, the linseed oil must be in excess; if a *dull* or *flattened surface*, then the quantity of turpentine, or *turps*, as it is often technically called, must be increased; and it is usual to add a small quantity of ground litharge and sugar of lead, which are prepared for this purpose, and sold under the name of *Driers*. For artists' colors, very fine linseed or nut oil is used, unboiled, and in small quantity, and turpentine is employed to dilute them. Paints for very rough purposes, such as ship-work, stone walls, etc., are often mixed with whale oil boiled with white vitriol (acetate of zinc), litharge, and vinegar; and they are diluted with common linseed oil and turpentine.

Most of the paints for ordinary purposes are composed first of the coloring matter, then of a quantity of white lead, with which and the oil they are worked into a paste of the shade required, and afterward thinned down with oil and turpentine when used. The white lead which thus forms the basis of most paints, and by itself a color, is a carbonate and oxide of the metal, produced by exposing pieces of lead to the action of the steam of acetic acid, in beds of fermenting tan. It is the principal white paint used, but is liable to discoloration from the gases contained in impure atmospheres. Other white pigments are prepared from the oxide of zinc, and

the carbonate and sulphate of barytes. Pale yellow is made with chromate of strontia, orange-yellow with sulphuret of cadmium, while several varieties of this color are produced by chromate of lead, sulphuret of arsenic or king's yellow, and various native earths in which silica and alumina are combined with oxide of iron. Among these are Yellow Ochre, Oxford, Roman, Stone, Orange, Indian, and American Ochres. *Reds* are either purely mineral, or they are *lakes*, i.e., organic colors precipitated on alumina bases. Of the latter, there are madder-lakes, prepared from madder-roots, and carmine-lakes, prepared from cochineal; of the former, vermilion (bisulphuret of mercury), Indian red (a native oxide of iron), Venetian red (also an oxide of iron), red lead (red oxide of lead, or *minium*). A very beautiful red is used by artists, called palladium red; it is formed of ammonio-perchloride of palladium. *Blues* consist of the artificial ultramarine, and, for artists' purposes, of the real ultramarine, also the silicate of cobalt, and, for water-colors, indigo and Prussian blue. *Greens* are either produced by mixtures of *yellows* and *blues*, or they are made directly from the phosphates, carbonates, acetates, and arsenites of copper, also from the sesquioxide of chromium, and from *terre verte*, a native mineral consisting of iron, silica, potassa, and magnesia. The last two are the best for artists. *Browns* are numerous, and various in their composition. Decomposed peat, burned madder, burned Prussian blue, burned terre verte, asphalt, manganese brown, catechu, umber (an oxide of iron with manganese), and mummy, or the asphalt mixed with other matters taken from Egyptian mummies, are among the best known and most used. *Blacks* are made of Lamp-black and Bone-black (q.v.), peroxide of manganese, and blue-black, which is made of the charcoal of burned vine twigs.

In all cases, the coloring materials of paints require to be very finely ground; and as many are very poisonous, great care is required in their preparation, and several forms of mill have been invented to protect the operator from the poisonous dust and exhalations, and to reduce the coloring material, if ground dry, to an impalpable powder, or, if mixed with the oil, to a perfectly smooth paste.

PAIR, n. *pār* [F. *paire*, a pair—from L. *par*, equal: Sp. *par;* It. *pare*, equal, alike]: two of a sort; a couple; two articles or parts, usually joined together, necessary to make a complete whole, as trousers, drawers, shoes, sheets, and the like; a man and his wife; a brace: V. to couple; to suit; to assort together in twos, as being similar or adapted to each other; to unite in couples; to be joined in couples. PAIR'ING, imp. PAIRED, pp. *pārd.* TO PAIR OFF, to separate from a company in pairs; in *parliament*, applied to two members of opposite political opinions, when they agree to absent themselves from divisions of the house, for a specified time, in order to neutralize each other's votes; the term is similarly applied

to electors, etc., of opposite views who agree mutually to refrain from voting. PAIRING OFF, imp. PAIRED OFF, pp. PAIRING-TIME, the season when birds couple. *Note.*—In OE. and provincial, *pair* was applied to any number of like or equal things, as 'a pair of cards' = a pack of cards; 'a pair of stairs' = a flight of stairs—see Skeat.

PAIRING (or PARING) MEAL [Scot.—see WHEAT]: the meal obtained from the wheat by *paring off* the surface of the grains after the bran has been taken off.

PAISIELLO, *pī-ze-ĕl'lo* (or PAESIELLO, *pâ-ā-ze-ĕl'lo*), GIOVANNI: eminent musician: 1741, May 9—1815, June 5; son of a veterinary surgeon at Taranto, Italy. He received his musical education in the Conservatorio St. Onofrio at Naples. Of his earlier operas produced at Naples, the most celebrated was *Dal Finto al Vero*, 1777. Some of his best works, particularly the delightful *Il Barbiere di Seviglia*, were written during an eight years' residence at St. Petersburg. At Vienna, he composed 12 symphonies for a large orchestra, and the opera buffa, *Il Re Teodoro*. 1785–99 he produced a number of operas for the Neapolitan theatre, and was appointed by Ferdinand IV. his *maestro di capella*. In consequence of having accepted, under the revolutionary govt., the office of national director of music, he was suspended from his functions for two years after the re-establishment of royalty, but eventually restored to them. In 1802 he went to Paris to direct the music of the consular chapel; but the indifferent reception shortly afterward given to his opera of *Proserpine* led him to return to Naples, where he died. His compositions are characterized by sweetness and gracefulness of melody, and simplicity of structure. The best of his operas would probably not hold the public attention to-day. The libretto of *Il Barbiere di Seviglia* was set to other music by Rossini, whose brilliancy meets the present popular taste, while P.'s opera is forgotten. Besides about 90 operas, P. composed masses, requiems, cantatas, an oratorio, instrumental quartets, harpsichord sonatas, concertos, and a highly praised funeral march in honor of Gen. Hoche.

PAISLEY, *pāz'lĭ:* municipal and parliamentary burgh, and important manufacturing town of Scotland, county of Renfrew; on both banks of the White Cart, three m. above its junction with the Clyde; seven m. w.s.w. of Glasgow by railway, 17 m. e.s.e. of Greenock. The progress of the town has been hindered by the fact that it was bankrupt nearly 30 years. A bill was passed 1872 by which a settlement was effected, and the town property restored to the corporation. Since then, extensive improvements have been made. An abundant supply of water is brought from the Gleniffer Hills, and recently from Rowbank.

By far the most interesting edifice is the abbey. It was founded by Walter, High Steward of Scotland, about 1163, for a prior and 13 monks of the Cluniac order of

reformed Benedictines, and was dedicated to St. James, St. Mirren, and St. Milburga. It was the burying-place of the Stuarts before the accession of that family to the throne, and was occasionally used by them afterward as a place of sepulture. It was raised to the rank of an abbey 1245. It was burned by the English 1307, and was mostly destroyed 1561. The building is in the First Pointed style. The nave, of six bays, still used as the Abbey Parish Church, was carefully and thoroughly restored by the removal of unsightly galleries, etc., 1862: it is one of the finest specimens of ancient Scottish ecclesiastical architecture. The choir and transepts are in ruins. Near the abbey is a monument to Wilson the ornithologist, who, like John Wilson (Christopher North) and Tannahill, was a native of Paisley. Other edifices are the county buildings and prison, a quadrangular pile in the castellated style; the Neilson Educational Institution, a noble bequest, in the form of a Greek cross, and surmounted by a fine dome; infirmary; school of design; and various banks. The grammar school was founded by King James VI., and the present building was completed 1864. In 1870 a free public library and museum was presented to the town, and is maintained by the community under the Free Libraries Act; and by a similar liberality was added a pleasure-ground named the Fountain Gardens. In 1873 a native of Paisley bequeathed £20,000 for erection of a town hall, which was completed 1880; it is a handsome classical building near the abbey. A large public park was presented to the town, and opened 1877; and an observatory was presented 1882. P. possesses a trust for the education of boys, the revenue of which amounts to £500.

In the beginning of the 18th c., the principal manufactures were coarse linens and checkered cloths. About the middle of that century, the weaving of linen and of silk gauze became the staple manufactures. In 1784 silk gauze was manufactured to the value of £350,000, and employed 5,000 looms. Shawls, which used to be a principal and are still an important article of manufacture, began to be made here in the beginning of the 19th c. Within recent years, the annual value of the shawl trade of P. was estimated at about £1,000,000 sterling, but it has now greatly declined. Cotton thread is manufactured on a most extensive scale; indeed, P. may be considered the seat of the thread manufacture for the British and American markets. Different varieties of tartan cloths, handkerchiefs, carpets, etc., are made; soap, starch, and corn-flour are largely manufactured; dyeing is carried on by several firms on an extensive scale; and power-loom factories, print-works, machine-shops, bleach-fields, shipbuilding yards, etc., are in operation in the town and vicinity. At the St. James's Day Fair, horse-races, originated by act of the bailies of the burgh in 1608, are held. Pop. (1881) 55,642; (1891) 64,379; (1901) 79,355.

PAIXHANS GUN, *pāks'anz:* smooth-bore cannon of large calibre (usually 23–28 centimetres), and 10 calibres length, with conical chamber, designed originally for firing, from aboard ship, at low elevation, and with strong powder charges, shells against the sides of vessels and shore fortifications. It was invented 1822 by Gen. (then maj.) Henri Joseph Paixhans, of the French army, or, rather, it was an adaptation by him of the principle of the gun known as 'Columbiad,' invented by an American officer, Col. Bomford. It had its first public and official test in the harbor of Brest 1824, with results so satisfactory that it was forthwith introduced into the French navy, and soon was adopted by all the maritime powers of Europe. Its first employment in actual warfare was at the siege of Antwerp by the French 1832, when it fully justified the favorable opinion regarding it. Its efficiency was again demonstrated during the Crimean war, when at Sinope the Turkish fleet was destroyed by the Russian shells 1853. It is now an obsolete weapon, having been superseded by the different types of rifled cannon.

PAJOK, n. *pāi'ŏk:* see under PATCH 2.

PAKS, *pŏksh:* market-town of Hungary, county of Tolna; 60 m. s.s.e. of Pesth, on the Danube. The river is here very winding, and the eastern bank a desert and useless morass. The town is subject to frequent inundations. Pop. 11,100.

PAL, n. *păl* [perhaps connected with Gael. *peall*, a horse, a faithful companion]: in *slang*, a partner; an accomplice; a female companion; a doxy.

PALACE, n. *păl'ās* [F. *palais*, a palace—from L. *Palātĭŭm*, one of the hills on which Rome was built, and on which stood the residence of Augustus]: magnificent house in which a sovereign or a great person resides; any splendid building; in Britain denoting usually the residence of a royal personage, or of a lord bishop; in Italy, the United States, etc., applied more generally; in *Scrip.* and *OE.*, a storeplace or cabinet. PALACE-COURT, a court formerly having jurisdiction over a circuit of twelve miles around Whitehall. PALACE-YARD, the open space within or around a palace. *Note.*—The leader of a body of Greeks who, in anc. times, migrated from Greece and settled in Italy, built a fortress and called it *Pallantion*, after his son *Pallas*—hence the Romans, by dropping an *l* and *n*, called the seats of princes *palatia*—see Foster on Accent, p. 48. The Palatine Hill is also said to have been named after *Pales*, a pastoral deity—see Skeat and Müller.

PALACKY, *pâ-lâts'kē*, FRANTISEK: Bohemian philologist, critic, and historian: 1798, June 14—1876, May; b. Hodslavitz, in Moravia. He studied philology and history at Presburg and Vienna; 1831 was appointed historiographer to the states of Bohemia. In the compilation of a general history of Bohemia, he searched libraries and archives in Bohemia, and in Germany and Italy. In the political agitation of 1848, P. was the leader of the

Slav or national party, as opposed to the German. His great work is *History of Bohemia* (in German and Bohemian, Prague 1836–67, 5 vols.): it has high repute for conscientiousness, thoroughness, and accuracy. Among his many other works is one on the most ancient monuments of the Czech tongue; and 1872 his 'Political Testament.' 'Father P.,' as he was fondly called, though himself a Prot., was regarded by Rom. Catholics generally with perfect confidence. He persistently but vainly opposed the reconstruction of Austria on a German-Hungarian basis; and when 1861 he was elected into the Austrian house of lords, he declined to attend.

PALADIN, n. *păl'ă-dĭn* [F. *paladin*—from It. *paladino*—from L. *palatīnus*, imperial: term originally derived from the Counts Palatine, or of the Palace (see PALATINE), the dignitaries at the Byzantine palace or court]: lord or chieftain. The knights of the round table were the *paladins* of Arthur or Charlemagne, whence 'a bravo warrior;' in the Italian romantic poets, a knight-errant.

PALÆ-, prefix: see PALE-.

PALÆOGRAPHY, etc.: see PALEOGRAPHY, etc.

PALÆOLOGUS, *pā-le-ŏl'o-gŭs*: illustrious Byzantine family, which appears in history first about the 11th c., and attained imperial dignity in the person of MICHAEL VIII. 1260. This emperor successfully undertook many expeditions to Greece and the Archipelago, and used in vain his utmost endeavors to heal the schism between the Roman and Greek churches.—His successor on the throne was his son, ANDRONICUS II. (reigned 1282–1328), under whose reign the Turks commenced in earnest a series of assaults on the Byzantine dominions. Andronicus attempted to oppose them with a force composed of mercenaries, but with small success, as these troops, with perfect impartiality, attacked both his enemies and his subjects. To pay them, he was compelled to levy such imposts as nearly destroyed Byzantine commerce. He associated his son, MICHAEL IX., with himself in the government, and was dethroned by his grandson, ANDRONICUS III. (reigned 1328–41), an able warrior and wise ruler, who repeatedly defeated the Bulgarians, Tartars of the Golden Horde, and the Servians, and diminished the oppressive imposts of the previous reign. He was, however, unsuccessful against the Catalans in Greece, and the Turks during his reign ravaged Thrace as far as the Balkans. He was greatly esteemed by his subjects, and merited the title 'Father of his Country,' which they bestowed.—His son, JOHN VI. (reigned 1355–91), a weak and voluptuous prince, attempted in vain both by force and bribery to stop the progress of the Turks; at last the pope, moved by his urgent entreaties, backed by a promise to submit the Greek Church to the pope's supremacy, urged the Hungarians and Servians to arm in defense of the Greek emperor; but the result was only an additional triumph to Sultan Amurath. The imbecile emperor was several times deposed, and,

on his final reinstatement by the sultan, acknowledged himself as his vassal for the capital and a small tract along the Propontis and Black Sea. Indeed, so degraded had the Byzantines become, that they obeyed the Sultan Bajazet's summons to aid him in reducing Philadelphia, the last Greek stronghold in Asia Minor. —His son, ANDRONICUS IV. (reigned 1355–73), who had been associated with him in the government, died in exile.—MANUEL II. (reigned 1391–1425) pursued the same tactics as his father, John VI., and with the same result. The allied army of the Hungarians, Germans, and French, which he had summoned to his aid against the Turks, was totally routed at Nicopolis by Bajazet, and Constantinople itself closely besieged. The invasion of Asia Minor by Timur, however, compelled the sultan to withdraw his whole force; and his subsequent defeat and capture at Angora 1402, and the contests among his sons for the supremacy, gave the Greek empire a breathing space. Having aided Mohammed I. in his contests with his brothers, Manuel was, by the grateful sultan, presented with some districts in Greece, Thessalonica, and on the Euxine.—JOHN VII. (reigned 1425–49), being pressed by the Turks, again held out to the pope the old bait of the union of the Greek and Western churches under his sway, and even presented himself at the Council of Florence, where, 1439, July, the union of the churches was agreed to. But on his return to Constantinople, the opposition of the Greek ecclesiastics to the union, supported by the people, rendered the agreement of Florence a dead letter. The pope, however, saw that it was for his interest to fulfil his part of the agreement, and accordingly stirred up Wladislas of Hungary to attack the Turks (see JAGELLONS); but this only hastened the downfall of the Palæologi.—John's brother, CONSTANTINE XIII. (reigned 1449–53), heroic scion of a degenerate race, accepted the crown after much hesitation, knowing his total inability to withstand the Turks, and even then took the precaution of obtaining the sultan's consent before he exercised the imperial authority; but some rebellions in Caramania, baffling Sultan Mohammed II.'s efforts to quell them, the emperor was willingly persuaded by his rash advisers that the time had now arrived for rendering himself independent of the Turks. The attempt brought swifter destruction on the wretched remnant of the Byzantine empire, for Mohammed invested the capital by sea and land, and after a siege, 1453, Apr. 6—May 29, Constantinople was taken by storm, and the last of the Palæologi fell fighting bravely in the breach.—A branch of this family ruled Montferrat in Italy from 1306, but became extinct 1533. The Palæologi were connected by marriage with the ruling families of Hungary, Servia, and the last of the family married Ivan, Czar of Russia—a fact which the czars of Russia have persisted till lately in bringing forward as a claim in favor of their pretensions to the possession of European Turkey. It is said

that direct descendants of the Palæologi are living at the present day in France. (For further information, see articles on some of the Byzantine emperors: also, BYZANTINE EMPIRE.)

PALÆONTOLOGY, etc.: see PALEONTOLOGY, etc.

PALÆSTRA: see PALESTRA.

PALAFOX Y MELZI, *pâ-lâ-fŏĉh' e mĕl'the*, Don JOSÉ DE, Duke of Saragossa: Spanish patriot: 1780–1847, Feb. 15; of a distinguished Aragonese family. He accompanied Ferdinand VII. to Bayonne, and, on seeing him made a prisoner there, fled to Saragossa, where he exerted himself to prevent the invasion of Aragon by the French. His defense of Saragossa (q.v.), 1808, July 27—1809, Feb. 21, which yielded to the French after a second investment, is one of the most brilliant and heroic incidents in modern history, and has conferred lasting glory on P. and the whole city. The ancient fame of the Spaniards for obstinate valor in the defense of walled cities was rivalled, if not surpassed, and Saragossa could proudly claim to vie with Numantia. P., sick and exhausted, was taken prisoner and conveyed by the ungenerous French to the dungeons of Vincennes, where he was treated with great hardship. Released 1813, he returned to Spain, and was appointed in the following year capt.gen. of Aragon. P. was no great politician, but he loved liberty and hated anarchy, and on more than one occasion he crushed the latter. After being created Duke of Saragossa, and Grandee of Spain of the first class, 1836, he kept himself apart from politics. He died at Madrid.

PALAGONITE, n. *păl-ăg'ŏ-nīt* [from *Palagonia*, in Sicily]: a peculiar rock-product of a yellowish-brown color, occurring near modern volcanoes.

PALAIS ROYAL, *pâ-lā' rwâ-yâl':* heterogeneous mass of buildings on the e. side of the Rue Richelieu in Paris; composed of a palace, theatres, public gardens, bazaars, shops, cafés, and restaurants. The old palace was built between 1624 and 36, on the site of the Hôtel Rambouillet, by Cardinal Richelieu, who at his death bequeathed it to Louis XIII. Henrietta of France, widow of Charles I., and Anne of Austria, queen mother, afterward lived in it for a time, with the latter's young son, Louis XIV. It subsequently became the town residence of the Orleans branch of the Bourbons, and during the minority of Louis XV. it acquired scandalous notoriety as the scene of the wild orgies in which the regent, Duke of Orleans, and his dissolute partizans were wont to indulge; and in the time of the duke's son, Philippe Égalité, it became the focus of revolutionary intrigue, and the rendezvous for political demagogues of every shade of opinion. This prince, partly to repair his impoverished fortunes, and partly to persuade the sans-culottes of Paris of the sincerity of his professed sympathy with their striving for equality, converted part of his gardens into a place of public resort, and the pavilions of the great court

into bazaars, which were divided into shops and stalls. On the downfall of Égalité, the P. R. was taken possession of by the republican govt., and used for the sittings of the tribunes during the Reign of Terror. On the restoration of the Bourbons, it reverted to the Orleans family, and was occupied by Louis Philippe till his election to the throne of France 1830, when it was incorporated in the general domains of the state, and ceased to be an appanage of the House of Orleans. The palace was sacked by the mob during the revolution of 1848, when many of its best paintings and most precious works of art were destroyed. After having been temporarily appropriated to various public purposes, it was thoroughly repaired and magnificently furnished, and given by Emperor Louis Napoleon 1855 to his uncle, Jerome Bonaparte, whose son, Prince Napoleon, resided there until 1871. The main entrance, with its elegant façade, is in the Rue St. Honoré; and on passing through the first court, the second or Cour Royale is reached, to the left of which stands the Théâtre Français, while immediately facing it is the celebrated Galerie Vitrée, or Glass Gallery, which contains on the ground floor some of the most brilliant shops of Paris, while the upper stories are occupied chiefly by cafés and restaurants. The garden, surrounded by this and other galleries, measures 700 ft. by 300. The Red Republicans set fire to the palace 1871, Mar. (see PARIS), when all the apartments occupied by Prince Napoleon were destroyed. The firemen and those who aided them, while forming into line to pass buckets of water, were fired upon by the insurgents; but kept to their work, and succeeded in checking the flames before they spread to the galleries and shops, which may be said to have remained almost intact. In the autumn of 1873 that part of the palace injured by the insurgents was restored. The garden, with its avenues and parterres, fountains and grass plats, still constitutes one of the liveliest and most frequented spots in the whole city; and though much of their glory has faded, its cafés still maintain, in great measure, the world-wide reputation of long ago.

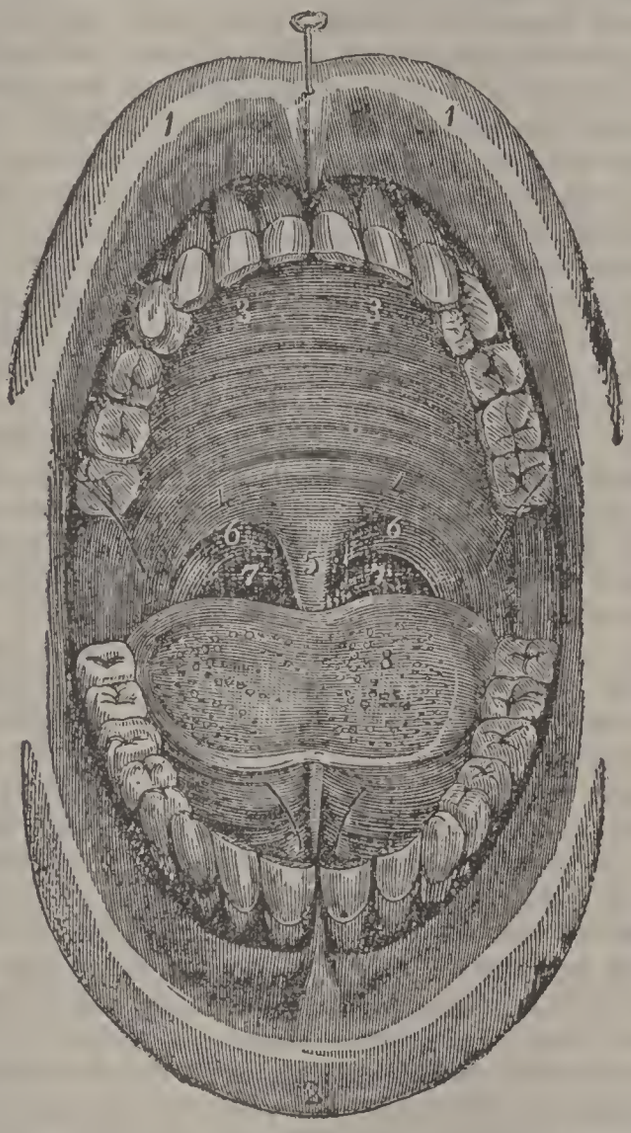
PALAMEDES, *păl-a-mē′dēz:* a prince and hero of Grecian mythology. He was sent to call Ulysses to assist some of the Grecian princes in war, proved that the insanity of the former was feigned, and compelled him to join the expedition, but thereby incurred his lasting enmity. By means of a buried treasure and a forged letter, Ulysses contrived to ruin P., who was convicted of attempting to betray the army to the enemy, and was stoned to death.

PALANQUIN, n., or PALANKEEN, n. *păl'ăng-kēn'* (Indian name *Palki*), [F. *palanquin;* Port. *palanquim*—from Hind. *palang*, a bed, a bedstead]: vehicle, usually for one person, commonly used in Hindustan and in China by travellers; a wooden box, about 8 ft. long, 4 ft. wide, and 4 ft. high, with wooden shutters which can be opened or shut at pleasure, and constructed like Venetian blinds for the purpose of admitting fresh air, while excluding the scorching rays of the sun and the heavy showers of rain common in that country. The furniture of the interior consists of a cocoa mattress, well stuffed, and covered with morocco leather, on which the traveller reclines; two small bolsters are placed under his head, and one under his thighs, to render his position as comfortable as possible. At the upper end is a shelf and drawer, and at the sides are nettings of larger dimensions than the ordinary pockets in carriages, for containing articles necessary to the traveller during his journey. At each end of the P., on the outside, two iron rings are fixed, and the *hammals*, or palanquin-bearers, of whom there are four, two at each end, support the P. by a pole passing through these rings and resting on their shoulders. Travelling in this mode is continued by day and night. (See DAWK.) The P. is used also at the present day in Brazil, with the prominent exception of Rio Janeiro. Similar modes of travelling have been at various times in use in w. Europe, but only for short distances. The Roman 'litter,' the French 'chaise à porteur,' and the 'sedan-chair' were the forms most in use, and the two latter were in general use in towns till they were superseded by hackney coaches. The Roman 'litter' was one of the criteria of its owner's wealth, the rich man generally exhibiting the prosperous condition of his affairs by the multitude of the bearers and other attendants accompanying him.

PALAPTERYX, n. *pā-lăp'tĕr-ĭks* [Gr. *palaios*, ancient; *a*, without; *pterux*, a wing]: genus of great fossil birds whose remains are found in the river-silt deposits of New Zealand, associated with the gigantic Dinornis; and which, like it, resembled, in the form of the sternum and the structure of the pelvis and legs, the living wingless apteryx. Two species have been described.

PALATE, n. *păl'āt* [OF. *palat*—from L. *palātum*, the palate or roof of the mouth: It. *palato*]: upper part or roof of the mouth (see below): the organ of taste; taste or relish: intellectual taste: in *bot.*, the projecting portion of the under-lip of personate flowers. PALATABLE, a. *păl'ă-tă-bl*, pleasant to the taste; savory. PAL'ATABLY, ad. *-blĭ*. PAL'ATABLENESS, n. *-tă-bl-nĕs*, the quality of being agreeable to the taste. PALATAL, a. *păl'ă-tăl*, uttered or formed by aid of the palate; pertaining to the palate: N. a letter pronounced by the aid of the palate. PALATINE, a. *-tīne*, pertaining to the palate.

PAL'ATE, THE: the upper part or roof of the mouth; consisting of two portions, the hard palate in front and the soft palate behind. The framework of the *hard palate* is formed by the palate process of the superior maxillary bone, and by the horizontal process of the palate bone, and is bounded in front and at the sides by the alveolar arches and gums; posteriorly it is continuous with the soft palate. It is covered by a dense struc-



The Mouth widely opened, so as to show the Palate:
1, 1, the upper, and 2, the lower, lip; 3, 3, the hard palate; 4, 4, the soft palate; 5, the uvula; 6, 6, the arches of the soft palate; 7, 7, the tonsils; 8, the tongue.

ure formed by the periosteum and mucous membrane of the mouth, which are closely adherent. Along the middle line is a linear ridge or raphe, on either side of which the mucous membrane is thick, pale, and corrugated, while behind it is thin, of a darker tint, and smooth. This membrane is covered with scaly epithelium, and is furnished with numerous follicles (the palatal glands). The *soft palate* is a movable fold of mucous membrane inclosing muscular fibres, and suspended from the posterior border of the hard palate, to form an incomplete septum between the mouth and the pharynx; its sides being blended with the pharynx, while its

lower border is free. When occupying its usual position (i.e., when the muscular fibres contained in it are relaxed), its anterior surface is concave; and when its muscles are called into action, as in swallowing a morsel of food, it is raised and made tense, and the food is thus prevented from passing into the posterior nares, and is at the same time directed obliquely backward and downward into the pharynx.

Hanging from the middle of its lower border is a small conical pendulous process, the *uvula;* and passing outward from the uvula on each side are two curved folds of mucous membrane containing muscular fibres, and called the *arches* or *pillars of the soft palate.* The *anterior pillar* is continued downward to the side of the base of the tongue, and is formed by the projection of the palato-glossus muscle. The *posterior pillar* is larger than the anterior, and runs downward and backward to the side of the pharynx. The anterior and posterior pillars are closely united above, but are separated below by an angular interval, in which the *tonsil* of either side is lodged. The tonsils (*ámygdalæ*) are glandular organs of rounded form, which vary considerably in size in different individuals. They are composed of an assemblage of mucous follicles, which secrete a thick grayish matter, and open on the surface of the gland by numerous (12 to 15) orifices.

The space left between the arches of the palate on the two sides is called the *isthmus of the fauces.* It is bounded above by the free margin of the palate, below by the tongue, and on each side by the pillars of the soft palate and tonsils. The arches of the palate assist in swallowing. The anterior arches during deglutition contract, so as to prevent the food from returning into the mouth; while the posterior arches contract at the sides, and so preclude the escape of food into the nose. The whole process of swallowing is performed firstly by the mass of food being brought to the back of the tongue. The lower jaw being next closed to afford a fixed point for the action of the muscles which raise the larynx, the food is sent into the elevated pharynx by the pressure of the tongue on the palate. The posterior palatine arches and soft palate prevent the escape of the food into the nose at this stage; the anterior palatine arches and tongue prevent it returning to the mouth; the epiglottis is shut over the upper opening of the larynx so as to prevent the food entering the windpipe; and by the action of the constrictor muscles of the pharynx the food is finally shot into the œsophagus or gullet.

As the upper lip may be fissured through imperfect development (in which case it presents the condition known as hare-lip), so also may there be more or less decided fissure of the palate. In the slightest form of this affection, the uvula merely is fissured, while in extreme cases the cleft extends through both the soft and hard palate as far forward as the lips, and is then often combined with hare-lip. When the fissure is consider-

able, it materially interferes with the acts of sucking and swallowing, and the infant runs great risk of being starved; and if the child grows up, its articulation is indistinct. For the relief of this condition an operation called *staphylorrhaphy* is performed.

Chronic enlargement of the tonsils is very frequent in scrofulous children, and is not rare in persons of more advanced age, and may give rise to very considerable inconvenience and distress. It may occasion difficulty in swallowing, nasal speech, deafness in various degrees from closure of the Eustachian tubes (now often termed *throat deafness*), and noisy and laborious respiration, especially during sleep. Iodide of iron and cod-liver oil are the medicines upon whose action most reliance is placed in these cases; while a strong solution of nitrate of silver, or some preparation of iodine, should be applied once a day to the affected parts. If these measures fail, as they frequently do, the tonsils must be more or less removed by the surgeon, either by the knife or scissors, or by a small *guillotine* invented specially for the purpose.

Enlargement or relaxation of the uvula is not uncommon, and gives rise to a constant tickling cough. If it will not yield to astringent or stimulating gargles, or to the stronger local applications directed for enlarged tonsils, its extremity must be seized with the forceps, and cut off with a pair of long scissors.

PALATIAL, a. *pă-lā'shĭ-ăl* [L. *palātĭŭm*, an imperial abode]: of the dimensions and beauty of a palace; royal; noble.

PALATINATE, *pa-lăt'ĭ-nāt:* name applied to two German states, united previously to 1620. They were distinguished as the Upper and Lower Palatinate. The Upper or Bavarian Palatinate, now forming a circle of the kingdom of Bavaria, was a duchy, and was bounded by Baireuth, Bohemia, Neuburg, Bavaria, and the dist. of Nürnberg; area 2,730 sq. m. Amberg was the chief city, andt he seat of govt. The Lower Palatinate, or the Palatinate on the Rhine, had from 3,045 to 3,150 sq. m.; and consisted of the electoral Palatinate, the principality of Simmern, the duchy of Zweibrücken, half of the county of Sponheim,a nd the principalities of Beldenz and Lautern. See BAVARIA.

The counts of the electoral or Rhenish P. were established in the hereditary possession of the territory of that name, and of the lands attached to it, as early as the 11th c. After the death of Herman III., Emperor Friedrich I. assigned the P. to Conrad of Swabia. After Conrad's death, his son-in-law, Duke Henry of Brunswick, came 1196 into possession of these lands; but he, having been outlawed 1215 by Friedrich II., was succeeded by his son, Otto III., Duke of Bavaria. Ludwig II., or the Strong, succeeded Otto III. in the P. 1253, and was in turn succeeded 1294 by Rudolf I., who was

banished by his brother, Emperor Ludwig, because he had taken part with Friedrich of Austria. The country was ruled by his three sons. Ruprecht III., who died 1410, was a German emperor. Of his four sons, Ludwig III. received the electoral or Rhenish P.; Johann, the Upper P.; Stephan, Zweibrücken; and Otto, Mosbach. The second and fourth lines soon died out, as also that of Ludwig III., which came to a close 1559, when the possessions of that prince, together with the electorate, passed to Friedrich III. of the Simmern line. He was succeeded by Ludwig IV. 1576, by Friedrich IV. 1583, and by Friedrich V. 1610, who, after he accepted the Bohemian crown, was driven from his possessions by the emperor 1619, and his office of elector was transferred to Maximilian, Duke of Bavaria. Karl Ludwig, son of Friedrich V., received the Lower P. at the peace of Westphalia, and in his favor a new or eighth electorship was created. With his son Karl, the Simmern line terminated 1685, when the P. fell into the hands of Philipp Wilhelm, count palatine of Neuburg.

The House of Neuburg was descended from Ludwig the Black, count palatine in Zweibrücken, second son of Stephan, count palatine in Simmern. Wolfgang, descendant of Ludwig, was the founder of all the other lines of counts palatine. Of his three sons, Johann founded the line of Neu-Zweibrücken; Karl, the Birkenfeld line; Philipp Ludwig, the Neuburg line. Philipp Ludwig had three sons, Wolfgang Wilhelm, August, and Johann Friedrich. The first founded the Neuburg line, the second the Sulzbach line, the third died childless. The son of Wolfgang Wilhelm died 1690. His son, Johann Wilhelm, became heir to the Beldenz line 1694. He was succeeded by his brother, Karl Philipp, who in turn was succeeded 1742 by Karl Theodor, from the Sulzbach line, who united the Bavarian territories with the Palatinate. Duke Maximilian of Zweibrücken next succeeded 1799, who at the peace of Luneville (1801) was compelled to cede a part of the Rhenish P. to France, a part to Baden, a part to Hesse-Darmstadt, and a part to Nassau. Treaties of Paris of 1814 and 15 reassigned the Palatinate lands beyond the Rhine to Germany, Bavaria receiving the largest share, and the remainder being divided between Hesse-Darmstadt and Prussia.

PALATINE, n. *păl'ă-tīn* [F. *palatin*—from L. *palātīnus*, of or belonging to the imperial abode: It. *palatino*, palatine]: a noble invested with royal privileges: ADJ. pertaining to a palace; possessing royal privileges. PALAT'INATE, n. the province of a palatine (see above). COUNTY PALATINE, a county over which a noble or bishop had received sovereign jurisdiction.—A *Palatine* (*Comes Palatinus* or Count Palatine) was, under the Merovingian kings of France, a high judicial officer, who had supreme authority in all causes that came under immediate cognizance of the sovereign. After the time of Charlemagne, a similar title was given to any powerful feudal lord to whom a province, generally

near the frontier, was made over with *jura regalia*, or judicial powers, similar to what the counts palatine had received in the palace; and the district so governed was called a *palatinate* or *county palatine*. There were three counties palatine in England—Lancaster, Chester, and Durham—which were, no doubt, made separate regalities on account of their respective proximity to the frontier of Wales and to that turbulent Northumbrian province which could not be accounted a portion of either England or Scotland. In virtue of their regal rights, the counts palatine had their courts of law, appointed their judges and law officers, and could pardon treasons, murders, and felonies; all writs and judicial process proceeded in their names, and the king's writs were of no avail within the bounds of the palatinate. Lancaster seems to have been made a county palatine by Edward III. Henry, first Duke, and John, second Duke, of Lancaster, both were invested by him with the dignity of count palatine. Henry VI. was hereditarily Duke and Count Palatine of Lancaster, and on his attainder, soon after Edward IV.'s accession, the duchy and county were forfeited to the crown, and confirmed on Edward IV.—afterward on Henry VII. and his heirs forever. The queen is now (1890) Duchess and Countess Palatine of Lancaster. There is still a chancellor of the duchy and county palatine, whose duties are few and unimportant, but the administration of justice has gradually been assimilated to that of the rest of England: see LANCASTER. Chester is supposed to have become a county palatine when made over with regal jurisdiction by William the Conquerer to Hugues d'Avranches. In the reign of Henry III. it was annexed to the crown by letters patent, and, since that time, the earldom palatine of Chester has been vested in the eldest son of the sovereign, or in the crown, whenever there is no Prince of Wales. Durham seems to have become a palatinate first when William the Conqueror constituted Bp. Walcher Bp. and Duke of Durham, with power (according to William of Malmesbury) to restrain the rebellious people with the sword, and reform their morals with his eloquence. The palatinate jurisdiction continued united with the bishopric till 1836, when it was separated by act of parliament, and vested in William IV. and his successors as a franchise, distinct from the crown, together with all forfeitures, mines, and *jura regalia*. It has since been more completely incorporated with the crown. Pembroke was at one time a county palatine, but ceased to be so in Henry VIII.'s time. The abp. of York also exercised the powers of a palatine in the county of Hexham in Northumberland, of which he was deprived in the reign of Elizabeth. In very early times there were a number of similar privileges in Scotland, the most important of which was that of the Earls Palatine of Strathearn. In Germany, the *Pfalzgraf*, or count palatine, exercised a jurisdiction much more extensive than the simple *Graf* or count. See PALATINATE.

PAL'ATINE HILL (*Mons Palatinus*): central hill of the famous seven on which anc. Rome was built, and, according to tradition, the seat of the earliest Roman settlements. In historical interest, it ranks next to the Capitol and the Forum. Its summit is about 160 ft. above sea-level. The form of the hill is irregularly quadrangular. Its n.w. slope, toward the Capitoline Hill and the Tiber, was called *Germalus* or *Cermalus*. The origin of the name is uncertain, though several derivations are given connecting it with legendary stories. Romulus is said to have founded the city upon this hill, and on Germalus grew the sacred fig-tree (near to the Lupercal) under which he and his brother, Remus, were found sucking the she-wolf. Upon the P. H. were the temple of Jupiter *Stator*, the temple of Cybele, the sacred square inclosure called *Roma Quadrata*, and other sacred places and edifices, besides many of the finest houses in Rome. Augustus and Tiberius had their residences here, whence Tacitus termed it *ipsa imperii arx* (the very citadel of government); and at last Nero included it entirely within the precincts of his *aurea domus*, which Vespasian subsequently restricted to the hill. From the time of Alexander Severus, it ceased to be the residence of the emperors; but the name *palace* (*palatium*), derived from it, was given to the abodes of sovereigns and great princes, and has been adopted into modern languages. Recent excavations have brought to light numerous remains of the palatial and other structures with which the P. H. was anciently covered; and these are now among the most interesting sights of 'the eternal city.'

PALATO-, *pă-lā'tō-* [L. *palātum*, the roof of the mouth, or the palate]: a prefix in many medical terms, signifying connection with the palate.

PALAVER, n. *pâ-lâ'vėr* [Port. *palavra;* Sp. *palabra*, a word, discourse, a promise: mid. L. *parabola:* F. *parole*, *parler*]: in *Africa*, a public deliberation or conference; superfluous or idle talk: V. to deceive by words; to humbug; to talk one over. PALA'VERING, imp.: N. idle, superfluous talk. PALA'VERED, pp. *-vėrd*.

PALAWAN, *pâ-lâ-wân'*, or PARAGUA, *pâ-râ'gwâ:* one of the Philippine Islands (q.v.).

PALAY, *pa-lā'* (*Cryptostegia grandiflora*): climbing plant of nat. order *Asclepiadaceæ* (q.v.), common in many parts of India, particularly on the e. coast of Hindustan. It yields a very fine strong white fibre, resembling flax, and which can be spun into the finest yarn. The fibre is obtained from the stalk; the milky juice contains caoutchouc.

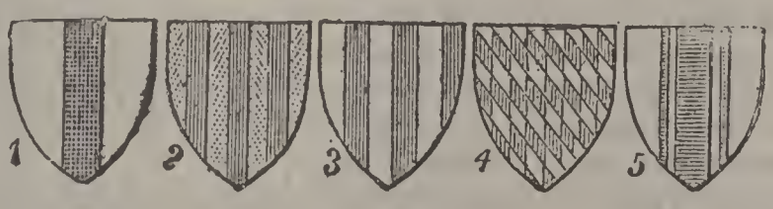
PALAZZOLO ACREIDE, *pâ-lât'so-lo â-krā-ē'dā:* town of Sicily, the province of Syracuse, 29 m. s.s.w. of Catania, on the brow of a hill, overhanging a deep valley. Near P. are remains of the ancient *Acræ*, founded by a colony from Syracuse, on the site of a Phœnician settlement, B.C. 664. The most curious remains are in

some low cliffs beneath the town, to the south, where is a series of arched niches, containing figures carved in high relief in the rock. The style of art appears to be archaic Greek, with somewhat of an Egyptian character. Pop. 9,954.

PALE- [Gr. *palaios*, ancient]: prefix used in many compound words, to signify ancient, of old time.

PALE, a. *pāl* [F. *pâle*, pale, wan—from L. *pallĭdus*, pale, pallid—from L. *pallĕō*, I am pale]: pallid; deficient in color; white of look; of faint lustre; dim; wan; used in many compounds, as *pale-eyed*, *pale-faced*, *pale-looking:* V. to turn pale or wan; to make pale; to become pale. PAL'ING, imp. PALED, pp. *pāld.* PALE'LY, ad. *-lĭ.* PALENESS, n. *pāl'nĕs*, the quality or condition of being pale; want of freshness; a sickly whiteness of look. PAL'ISH, a. *-ĭsh*, rather pale. PALE ALE, a light-colored bitter ale. PALE-FACED, having the face wan or white. PALE-HEARTED, in *OE.*, dispirited; discouraged.

PALE, n. *pāl* [F. *pal* and *palis*, a pale or thick lath—from L. *pālus;* It. *palo*, a pole, a stake: Sp. *palo*, a stick: Ger. *pfahl*, a pile, a stake: W. *palis*, a thin partition of board]: a narrow-pointed piece of board fixed in the ground, or nailed to a rail, or both, used to inclose grounds and parks: that which incloses or fences in; the space inclosed by rails; limits or limited territory; used figuratively, as, within the *pale* of the church; a cheese-scoop; in *her.*, one of the figures known as ordinaries, consisting of a broad perpendicular band in the middle of the shield (see No. 1). Several charges of any kind are said to be 'in pale' when they stand over each other perpendicularly, as do the three lions of England. A shield divided through the middle by a perpendicular line is said to be 'parted per pale.' The Pallet is the diminutive of the pale (see No. 2). When the field is divided into an even number of parts by perpendicular lines, it is called 'paly of' so many pieces (see No. 3).



When divided by lines perpendicular and bendways crossing, it is called 'paly bendy' (see No. 4). An Endorse is a further diminutive of the pallet, and a pale placed between two endorses is said to be endorsed (see No. 5). PALE, v. to inclose. PALING, imp. *pāl'ĭng*, inclosing with pales: N. a fence or barrier formed with pales; the materials for erecting a fence or barrier of pales. PALED, pp. *pāld:* ADJ. striped. ENGLISH PALE (see PALE, ENGLISH).

PALE, *pāl*, ENGLISH: in Irish history (see IRELAND, *History*), that portion of the kingdom over which the English rule and English law were acknowledged. There is much vagueness in the meaning of the term, from the great fluctuations of the English authority in Ireland. The designation dates from the reign of John, who distributed the portion of Ireland then nominally subject to England into 12 counties palatine—Dublin, Meath, Kildare, Louth, Carlow, Kilkenny, Wexford, Waterford, Cork, Kerry, Tipperary, and Limerick. To this entire district, in a general way, was afterward given the designation of the Pale. But as the term is applied by writers of each period to the actual English territory of their period, care must be taken to indicate the period. In a general way, however (not quite exact, but sufficient for most purposes), the Pale may be considered as comprising the counties Dublin, Meath, Carlow, Kilkenny, and Louth.

PALEA, n. plu. *pā′lĕ-ă*, or PALES, n. plu. *pālz* [L. *palĕă*, chaff: F. *paille*]: in *bot.*, a name given to the small scale-plates, like chaff, in the receptacles of some composite flowers; the scale-like parts of the flowers of Grasses (q.v.), within the glume. PALEACEOUS, a. *pā′lē-ā′shŭs*, resembling chaff; covered with small membranous grains like chaff. PALEOLÆ, n. plu. *păl′ē-ō-lē*, in *bot.*, two, rarely three, little scales, situated a little in front of the external palea—also called the *squamulæ*, *glumellulæ*, or *lodiculæ*.

PALEARCTIC REGION, n. *păl-ē-ârk′tĭk:* in *zool.* and *geog.*, one of the six faunal regions into which Sclater's system divides the land of the globe—a very extensive region, comprising all temperate Europe and Asia, from Iceland to Behring Strait, and from the Azores to Japan. To the s. it includes the extra-tropical part of the Sahara and Arabia, and all Persia, Cabul, and Beloochistan, to the Indus. It comes a little below the upper limit of forests in the Himalayas, and includes the larger n. portion of China, nearly to the coast of Amoy.

PALEASTER, *pā-lē-ăs′tėr* or *păl-ē-* [Gr. ancient star-fish]: genus of star-fish peculiar to the Silurian period, which in general appearance resemble the living brittle stars, but present so many anomalies that they cannot be referred to any existing family.

PAL′EFITS: see LAKE DWELLINGS: CRANNOGS.

PALEMBANG, *pâ-lĕm-bâng′*: formerly an independent kingdom on the e. coast of Sumatra, now a Netherlands residency; bounded n. by Djambi, n.w. by Bencoolen, s. by the Lampong districts, s.e. by the Strait of Banca; 61,900 sq. m. Much of the land is low-lying swamp, covered with a wilderness of impenetrable bush; but in the s. it rises into mountains, of which Oeloe Moesi (Ulu Musi) is 6,180 ft. high. Gold-dust, iron ore, sulphur with arsenic, lignite, and common coal are found; also clays suitable for coarse pottery, etc. Springs of pure oil occur near the coal-fields of Bali Boekit (Bukit), and of mineral water in various places. Rice, cotton, sugar, pepper, tobacco, and, in the interior, cocoa-nuts, are grown; the forests producing gutta-percha, gum elastic, rattans, wax, benzoin, satinwood, etc. The rivers abound with fish; and the elephant, rhinoceros, tiger, panther, and leopard roam the woods, as well as the deer, wild swine, and goats, with many varieties of monkey.

In the dry season the thermometer ranges from 80° to 92° F., and in the rainy season 76° to 80°. The climate is healthful, except in the neighborhood of the swamps. The natives are descended from Javanese, who in the 16th c., or earlier, settled in P., and ruled the whole land. The race, however, has become mixed with other Malays, and the language has lost its purity. In the n.w. interior is a tribe called the Koeboes (Kūbūs), of whose origin nothing is known, but who are probably the remainder of the aborigines. They do not follow agriculture, go about almost naked, and live chiefly by fishing and hunting. They are thought to lack idea of a Supreme Being, though they believe in existence after death. Pop. (1900) 692,317.

PALEMBANG′: town, cap. of the kingdom and residency of P.; 52 m. from the Soensang (Sunsang), or principal mouth of the river Moesi (Musi), in 2° 59′ s. lat. and 104° 44′ e. long. The city is built on both banks of the Moesi, and other streams which fall into it, and is five m. long by half a mile broad. The river is more than 1,000 ft. wide, and 40 to 50 ft. deep, so that the largest vessels can sail up to the city. The native houses are raised on posts, and neatly constructed of planks or bamboos; the Chinese, Arabians, and Europeans chiefly living in floating houses called rakits, of which there are more than 500, and holding communication with one another and with the natives by boats. The fort is built on the left bank of the river, and behind it are an institution for the blind and a splendid mosque. There is a school, where 30 European children are educated, a govt. elementary school for natives, and several good Chinese schools. Many of the natives can read and write, and in 1856 a native printing-press was erected.

P. is visited annually by more than 30,000 boats of various sizes, bringing produce from the interior, consisting chiefly of rice, benzoin, gum elastic, gutta-per-

cha, raw cotton, rattans, tobacco, pepper, wax, dragon's blood, resin; and gold-dust from the boundaries of the kingdom of Djambi, now included in the residency. These are obtained chiefly in exchange for salt, cotton manufactures, earthenware, iron and copper wares, and provisions. The large foreign trade is chiefly with Java, Banca, Singapore, China, and Siam. The imports, considerably exceeding the exports, have average annual value of nearly $1,500,000. The natives of P. are good ivory-carvers, gold and silver smiths, jewellers, cutlers, japanners, painters, boat-builders, bookbinders, etc., and expert at all ordinary handicrafts. The women make cotton fabrics, do spinning and dyeing, and weave silk stuffs embroidered with gold. Pop. 44,000, of whom 100 are Europeans, 3,000 Chinese, and 2,000 Arabians.

PALENCIA, *pâ-lān'thē-â:* Spanish province, one of the 8 divisions of Old Castile; very irregular in form; bounded n. by Santander, e. by Burgos, s. by Valladolid, and w. by Valladolid and Leon; 3,127 sq. m. The principal rivers are the Pisuerga and the Carrion. With the exception of the n. portion, which has numerous mountains interspersed with fertile valleys, and a large marsh in the s., the province is an elevated table-land nearly destitute of timber. There are several coal mines. Other minerals abound, but are not mined. A railroad passes through the province, one crosses the s.e. portion, and there is an important canal from Alar del Rey to Valladolid. Most of the roads are neglected. Agriculture is the principal occupation, but there are some manufactures, principally of linen and woolen goods. Pop. (1887) 188,954; (1900) 192,473.

PALEN'CIA (anc. *Pallantia*): city of Spain, in Old Castile, cap. of the modern prov. of P.; in a treeless but well-watered and fruitful plain, on the Carrion, 30 m. n.e. of Valladolid. It is a bishop's see, and is surrounded by old walls, 36 ft. high and 9 ft. thick, around which are pleasant promenades. The cathedral, of the later Spanish Gothic, was built 1321–1504. The first univ. in Castile was built here in the 10th c., but was removed to Salamanca 1239. Nearly one-third of the people are employed in manufacture of blankets and coarse woolen cloths. The position of the town on the Carrion, and on the Castilian Canal, is favorable to commerce. The vine is cultivated, and there is good trade in wool.

PALENQUE, *pâ-lĕn'kā*, RUINS OF: on the Rio Chacamas, branch of the river Usumasinta, in the state of Chiapas, Mexico; 8 m. s.e. of the village of Santo Domingo de Palenque; lat. 17° 30′ n., long. 92° 25′ w. The ruins extend over a large area, covered with a dense tropical forest, and are of difficult exploration: they consist of vast artificial terraces, or terraced truncated pyramids, of cut stone, surmounted by edifices of peculiar and solid architecture, also of cut stone, covered with figures in relief, or figures and hieroglyphics in stucco, with remains of brilliant colors. Most of the buildings are of one story, but a few are two, three, and some may have been four stories. The principal structure, known as the Palace, is 228 ft. long, 180 ft. deep, and 25 ft. high, standing on a terraced truncated pyramid of corresponding dimensions. It was faced with cut stone, cemented with mortar of lime and sand, and the front covered with stucco and painted. A corridor runs around the building, opening into four interior courts, which open into many smaller rooms. On slabs of stone are carved numerous colossal figures, and the remains of statues more resemble Grecian than Egyptian or Hindu art. Other spacious and elaborately ornamented buildings appear to have been temples of religion. These ruins were in the same condition when Cortes conquered Mexico as now, overgrown with a forest, and their site forgotten. They were discovered 1750. Three explorations were made by the Spanish govt., but the ruins were little known until visited by Messrs. J. L. Stephens and F. Catherwood, and their account published with plans and drawings. See Stephens's *Incidents of Travel in Central America*, etc., and Catherwood's *Views of Ancient Monuments of Central America*, etc. There are in Mexico dim traditions of the existence, at a remote period, of the capital of a theocratic state, the centre of a long-since extinguished civilization, of which the only traces are these wonderful ruins and unexplained hieroglyphics.

PALEOBOTANY, *pā'lĕ-ō-bŏt'ăn-ĭ:* the science which treats of fossil plants, a branch of paleontology (q.v.). Fossil remains of vegetation, in the form of petrified wood, were described centuries ago by writers on natural history, and leaf impressions were described and figured by authors in the 17th century; but it was not until the early part of the 19th century that the study of fossil plants was placed on a scientific basis. Since that time the subject has received constantly increasing attention.

The study of extinct flora has shown that living species have been evolved from simple forms, low in the scale of life, through forms successively higher and more complex. Some reached a maximum of development far back in geological time and then retrograded or became extinct, while others have continued their upward development to the present day. The period of maximum development of any type is known as the 'age' of that type,

and thus it is possible to divide geologic time as a whole into a succession or series of plant ages and to designate each age by the name of the particular type of vegetation which was predominant at that time. Such a series is indicated in the following table:

Geologic Time Divisions	Geologic Periods	Plant Ages	
Neozoic	Modern Quaternary Tertiary	Age of Spermatophytes	Age of Angiosperms
Mesozoic	Cretaceous Jurassic Triassic		Age of Gymnosperms
Paleozoic	Carboniferous Devonian U. Silurian, L. Silurian, Ordovician. Cambrian	Age of Cryptophytes	Age of Pteridophytes
Eozoic	Huronian Laurentian		Age of Thallophytes

On theoretical grounds plant life is assumed to have preceded animal life, not only for the reason that the latter is dependent upon the former for its existence and sustenance, but also because plants are lower in the scale of life than animals and are capable of existing under conditions that would be fatal to the latter. Exactly what the primitive vegetation of the earth was like can not be determined, for the reason that its remains were either entirely obliterated, or so altered, by the metamorphism to which all the older rocks were subjected, that its original characters are lost. Its former existence, however, is indicated by the presence of carbon, in the form of graphite, in these rocks, and graphite is known in numerous instances to have resulted from the metamorphism of coal derived from vegetation.

Thallophytes.—The microscopic size of the lower thallophytes and the cellular structure of the others are factors which would make them poor subjects for preservation, and their comparative rarity as fossils is therefore to be expected. The schizophytes, representing the agencies of disintegration and decay, must have been present at the very beginning, but their assumed existence is purely theoretical. Seaweeds and fresh-water algæ are abundantly represented by casts, tracings, and markings of various forms, and occasionally by the re-

mains of the stems, when they were of sufficient consistency for preservation. Even if all the doubtful forms are eliminated, a sufficient number remain to demonstrate their existence as far back as the Cambrian Period, and they are represented in the rocks of every succeeding period. The diatoms are most abundantly represented, and they are also the most perfectly preserved of all the thallophytes, by reason of their silicious tests. The genera and species are largely the same as those now living.

Pteridophytes.—The ferns, and their allies, lycopods and equisetums, compose the most interesting of any group of fossil plants. They had their origin far back in geologic time, probably in the Lower Silurian (Ordovician) Period. In the Devonian they had become well established and their maximum of development was reached in the Carboniferous, at which time they probably formed at least 75 per cent. of the entire flora. After that they steadily declined, not only in numbers but also biologically, and their present living representatives are mere degenerate descendants of the gigantic forms which preceded them. The ferns certainly began as far back as the Devonian Period, and probably earlier. They are the best known of all fossil plants, and were the first to receive serious attention and study from paleobotanists. This was largely due to their extensive representation in connection with the coal of the Carboniferous Period and their discovery as an incident of mining operations, through which they were being constantly brought to light. In general appearance the Paleozoic forms differed but little, except in size, from those of to-day, and many of the Mesozoic forms were apparently identical with living genera, while some Tertiary species are hardly to be separated from living ones. Equisetums, or plants very closely related to them, are definitely recognized in rocks of Devonian age, and, like the ferns, they rapidly developed in the Carboniferous Period. The lycopods probably had their beginning as far back as the lower part of the Upper Silurian Period, and reached their maximum of development in the Carboniferous, at which time they were, next to the ferns, the most important element in the flora. Their gigantic trunks and limbs are known under the generic names, *Lepidodendron, Lepidophloios,* etc. These genera became extinct at the close of Paleozoic time and were succeeded by others closely related to or identical with the living *Lycopodium* and *Selaginella.*

Spermatophytes.—The time of origin of this sub-kingdom of plants is more or less obscure, but it probably dates as far back as the Upper Silurian Period, and they are definitely known to have been in existence in the Devonian. Their development was slow and they did not assume any degree of prominence until Mesozoic time, when they became the dominant type of vegetation and have continued as such up to the present time.

The gymnosperms, of which our coniferous trees and

cycads are the best known representatives, are the oldest type. The extinct genus *Cordaites* is known in the Devonian Period, but as a class they were of little numerical importance until Mesozoic time, when, in the Triassic and Jurassic Periods they reached their maximum of development and became the dominant type of vegetation, forming perhaps 60 per cent. of the flora. Since then the cycads have almost disappeared, except in the warm parts of the world, but the coniferous trees, although in diminished numbers, are yet an important element in the living flora of all sections.

The angiosperms may have had their origin in late Paleozoic time, but the earliest remains which have been satisfactorily identified are not older than Mesozoic. Toward the close of the Jurassic Period they appeared in considerable numbers and subsequently developed so rapidly that in the Cretaceous Period they had become the dominant type and they have maintained this position ever since. The Monocotyledones are relatively not well represented as fossils and their origin is obscure. On theoretical grounds they probably antedated the more highly developed Dicotyledones, but satisfactory evidence on this point is lacking.

The Dicotyledones are first recognizable in certain archaic forms, from the Jurassic or lower Cretaceous horizons of North America and Europe, to which Saporta gave the name 'proangiosperms.' In some of these the dicotyledon type, as we know it in our living flora, is merely indicated rather than expressed, and it is almost impossible to classify them satisfactorily with any living allies. From these, however, the modern generic types of the dicotyledons developed so rapidly that it was essentially a modern flora, in all except its species, by the middle of the Cretaceous Period, and what are apparently living species began to appear in the early Tertiary. At the close of the Tertiary Period it is probable that nearly all the species were identical with living ones, as all the remains which have been found in Quaternary deposits are identifiable or referable to species now in existence.

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PALEOCOSMIC, a. *pā'lē-ō-kŏs'mĭk* [Gr. *palaios,* ancient; *kosmos,* the world]: a term designating the earliest portion of the prehistoric stone period; same as paleolithic.

PALEOCRYSTIC, a. *pā'lē-ō-krĭs'tĭk* [Gr. *palaios,* ancient; *kruos,* frost]: applied to the perpetually ice-cov-

ered region of the Arctic Ocean, around the north pole; applied to both the Arctic and Antarctic seas, as perpetually covered with ice of unknown ages. See ARCTIC OCEAN.

PALE OF SETTLEMENT: a special section of Russia in which Jews have the right of residence, for they are not allowed to live in any portion of Russian territory, nor can they leave the Pale, temporarily or permanently, except under legally defined conditions. It dates back to 1791, when the Jews who had come under Russian sway on the first partition of Poland (1772) were prohibited from joining merchant or artisan guilds outside of White Russia, their right of residence being extended to the provinces of Ekaterinoslav and Taurida. This regulation has held ever since with occasional modifications of the Pale's limits, which were enlarged with successive partitions of Poland, where the Jews resided in force, until now it includes fifteen governments: Bessarabia, Wilna, Vitebsk, Volhynia, Grodno, Ekaterinoslav, Kovno, Minsk, Moghilef, Podolia, Poltava, Taurida, Kherson, Chernigov, and Kiev. There are few concessions to Jews in the merchant guilds, and to students and their parents; but the lines, especially since the promulgation in 1882 of the May Laws (q.v.), have been tightly drawn and constitute a 'Chinese Wall' which practically excludes Jews from all but a comparatively small portion of Russia, except in a few governments like Warsaw, Lublin, etc., where they have always lived under some restriction. Conditional residence is also allowed them in the Caucasus, in Turkestan, and in Siberia, but under restrictions and with occasional revoking of all privileges.

The following classes of Jews have the right, practically, to reside permanently in any part of Russia: Merchants of the first guild of five years' registry in the Pale; those who have a higher education, like physicians, university graduates, technologists, dentists, pharmacists, mid-wives; those who have completed their term of military service according to the conscription regulation, whose rights are always liable to be abolished; and finally, artisans, whose privileges were never permanent and subject to sudden alterations. Within the past few years, however, there have been slight modifications of the right of residence which augur well for the future, when Russia takes its place among the constitutional governments of the world and the Jews are admitted to complete civil and religious liberty, as in other lands, where once, too, they were disfranchised and treated as serfs.

PALEOGEAN, a. *pā'lē-ō-jē'ăn* [Gr. *palaios*, ancient; *gē*, the earth]: pertaining to the former conditions of the earth's surface, as revealed by geology—distinct from the present surface of the globe, as described by geography.

PALEOGRAPHY.

PALEOGRAPHY, or PALÆOGRAPHY, *pā-lē-ŏg'rā-fĭ:* study of ancient handwriting from surviving examples: distinguished from Epigraphy in that P. takes cognizance of writings executed with such instruments as a reed (*calamus*) or a style (*stilus, graphium*) on papyrus, waxed tablets, parchment, or other substances, which in different ages have fulfilled the uses of paper, while Epigraphy has to do with inscriptions cut in stone, metal, or other enduring materials. Sometimes the term P. is employed in a wider sense, as comprehending the art of reading ancient writings, and such a critical knowledge of all their circumstances as will serve to determine their age, if they happen to be undated, and their genuineness in the absence of any formal authentication. For these purposes the paleographer needs to be acquainted with the various substances, such as bark, leaves, skins, paper, etc., which have been used for writing; with the various manners of writing which have prevailed, and the changes which they have undergone; with the various forms of authenticating writings, such as seals, signets, cachets, signatures, superscriptions, subscriptions, attestations, etc., which have been employed at different times; with the various phases through which the grammar, vocabulary, and orthography of the language of the writing with which he is dealing, has passed; and with more or less, as the case may be, of the history, laws, institutions, literature, and art, of the age and country to which the writing professes to belong.

Of ancient Greek and Roman written documents a certain number have come down to our time; and selections from these as well as from later MSS. are used in this article to illustrate the sort of materials that form the subject-matter of P.; these writings are, so far as the most ancient ones are concerned, on papyrus or on waxed tablets, while the less ancient documents are on vellum or on paper: see PAPER; PAPYRUS: VELLUM. The tablets used by the Greeks and Romans—called by the Greeks *deltoi, deltidia, ptyktoi, pinakes,* and by the Romans, *tabulæ, tabellæ, pugillares, ceræ,* were usually of wood, but sometimes of ivory; they had a raised margin round the edges, and the surfaces were covered with a thin layer of wax—hence the name commonly given to them by the Romans, *ceræ,* plural form of *cera,* wax: the Greek names all mean thin boards, tablets, and *deltos, deltidion,* furthermore indicate one of the original forms of such tablets—that of the Greek letter *Δ*. The tablets were used for temporary memoranda, and as we use slates: for use in schools they were usually strewn with sand, instead of being covered with wax. Two or more tablets held together by rings or other fastenings which served as hinges, were termed by the Romans *caudex* or *codex* (*block* of wood), or, according to the number of tablets so held together, *ceræ duplices, triplices, quadruplices, quintuplices,* etc. (books of 2, 3, 4, 5 tablets); by the Greeks a two-leaved book of tablets was called *pinax* (or *deltos*) *diptychos,* and one of 3, 4, 5 tablets, *pinax triptychos, tetraptychos, pentaptychos,* and so on.

The history of Greek P., so far as it can be written from

extant materials, begins with B.C. 3d c., and ends with the close of the 15th c. and the introduction of the art of printing. During that period Greek handwriting is seen to have passed through two phases—that of the uncial or large letter, and that of the minuscule or small letter; the beginning of the 9th c. marks the time of transition, though naturally survivals of the antiquated uncial letters may be noted in documents long subsequent to the year 800, and on the other hand anticipations of the minuscule not a few are seen in MSS. dating from an earlier period. Both the uncial and the minuscule are seen in two styles—the set, or more formal, and the cursive. The difference between the capital letters and the uncial is no doubt a result of the difference in the materials upon which the inscriptions were made. When the letter *E* (*epsilon*) was to be carved on stone or bronze, it was manifestly easier to give it that form than the uncial form ϵ ; the same is to be said of Σ (σ,ς) and Ω (ω); but in writing with a style on a waxed tablet, or with a reed or a quill pen (the use of the latter can be traced no farther back than the 6th c.) on papyrus or parchment, the uncial form is the more convenient; and as the transition from capitals to uncials was due to the difference of materials on which the inscription was made, so no doubt the change from uncial to minuscule is, at least in part, due to the general use of vellum and later of cotton and linen paper.

The earliest examples of Greek uncial writing extant have been discovered in Egypt and in the ruins of Herculaneum, and they are on papyrus. Those from Herculaneum are certainly of a date not later than A.D. 79, when the town was destroyed; probably they were all written during that century. Of the papyri from Egypt there are a few whose *downward* date-limit is accurately ascertained. The earliest Greek MSS. extant were discovered at the village of Kurob, Egypt, by Flinders Petrie, of the Univ. of Dublin, 1890. These are of a date certainly prior to B.C. 235, and comprise fragments of classical writings and records of a probate court, some dating from the reign of the 2d Ptolemy, the rest from the reign of the 3d Ptolemy. In the London *Athenæum*, 1890, Oct. 24, Prof. Mahaffy announces as immediately, forthcoming an edition of these papyri, with fac-simile reproductions. Of the handwriting of these documents he says that it 'varies from large, clear, splendid writing to the most fugitive and illegible cursive.' Prior to Petrie's discovery the most ancient Greek MS. document extant was an astronomical work entitled *Εὐδόξου τεχνή*, now in the Louvre collection. This has, written on the back, deeds bearing dates equivalent to B. C. 165 and 164, and hence is certainly as old as the middle of B.C. 2d c. The main MS. is written in a hand intermediate between the formal, or set, and the cursive. In the Louvre collection are also fragments of a work on dialectics, indorsed with a deed of B.C. 160: the writing is in set uncials of simple style, executed with a fine light stroke, without exaggeration of forms in the letters: in these respects it seems a fair type of the writing in vogue during the 2

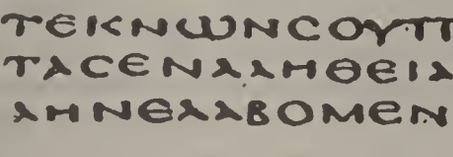
or 3 centuries preceding the Christian era. In a tomb near Monfalat was found, 1849, a fragmentary papyrus containing portions of the *Iliad:* it dates from not later than B.C. 1st c.; the text is in slender uncials, very regular. The Louvre collection contains also fragments from the *Iliad,* which date from perhaps the 2d c. of our era. A fragment of poetic lines, supposed from the lost *Temenides* of Euripides, together with a few lines from the *Medea,* is in the private library of Firmin-Didot, bibliopole, of Paris, the date of which is not later than B.C. 161, a document of that year having been added. One of the most important discoveries hitherto made of Greek papyri in Egypt is that of one containing 2 orations by Hyperides, now in the Brit. Museum: it is a roll, 11 ft. long, in unusually good preservation. The writing is elegant, in set uncials, which however are often linked together without raising the pen: this document is certainly not more recent than B.C. 1st c. The Herculaneum Greek papyri are usually written in neatly-formed and regularly-spaced uncials.

Of tablets inscribed with Greek uncial writing, very few have come down to us. There are 2 in the British Museum. These are from Memphis, and on one are traced some verses in large, roughly-formed letters, whose date can only be conjectured to fall within the 1st c. of our era. In the Cabinet des Medailles at Paris, is a set of 5 tablets on which are scribbled alphabets; also, in a more current hand, a contractor's accounts. Finally, a tablet from which the wax is worn, has, inscribed upon the wood, characters in ink: it dates probably from the 4th century.

The firmer and smoother surface of vellum favors a more exact style of writing and a firmer hand, but no Greek MS. on vellum of a date earlier than the 4th c. is known to exist. The earliest examples of MSS. on vellum are the 3 famous codices of the Bible, and of these the conjecturally most ancient—the *Codex Vaticanus* (see VATICAN CODEX)—is probably of the 4th c. The writing, in its original condition, must have been very perfect as a specimen of penmanship, but nearly the whole of the text has been traced over by a later hand, probably in the 10th or 11th c., a small number of words only being left untouched. Written in characters of uniform size, without enlarged initial letters, the MS. has all the simplicity of great antiquity. The *Codex Sinaiticus* (see SINAITIC CODEX) bears the same tokens of antiquity, and is by its discoverer, Tischendorf, judged to be older than *Vaticanus:* but the writing of *Sinaiticus* is not so pure as that of *Vaticanus,* and if that is a criterion of age, *Vaticanus* is the older. The *Codex Alexandrinus* (see ALEXANDRIAN CODEX) is referred to the middle of the 5th c.; it has enlarged letters at the beginnings of paragraphs; the writing is more elegant than that of *Sinaiticus.* In all three codices we find simplicity and regularity the leading features; the round letters are formed in symmetrical curves; Ε, C, etc., finishing off in a hair-line, thickened at the end into a dot; horizontal lines fine, those of Ε, *H,* and Θ, being either in the middle or high in the letter; the base of Δ and the cross-stroke of *Π* also fine.

and as a rule, kept within the limits of the letters, and not projecting beyond.

From the 5th c. there have come down to us fragments of an illustrated *Homer*, in which the writing is somewhat taller than in the three codices, the cross-stroke in ϵ is abnormally low down, the stem of the *P* (rho) is not produced

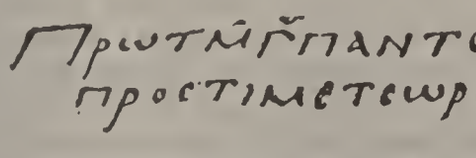


Greek Uncial (Cod. Alex.), 5th century.
(τεκνων σου περιπατουν
τας εν αληθεια καθως εντο
λην ελαβομεν απο του π[ατ]ρ[ο]ς.—2 John 4.)

below the line. To the same c. is probably to be referred also the palimpsest *Codex Ephraemi* (q.v.), an incomplete New Test. with the letters imperfectly erased, and homilies of Ephraem Syrus written over them (see PALIMPSEST); the *Octateuch*, whose leaves are divided between Paris, Leyden, and St Petersburg; the illustrated *Genesis* in the Cottonian Library, and the *Dio Cassius* of the Vatican.

The uncial writing of the 6th c. shows signs of degeneration in larger characters, more heavily formed, and not so completely written, cross-strokes in such letters as *A*, *Δ*, *Π*, *T*, produced and terminating in heavy points. The *Dioscorides* at Vienna is the type of 6th c. uncial writing. Other MSS. of the 6th c. are a palimpsest *Homer* and palimpsest fragments of *Luke*, with Syriac text written above both; palimpsest fragments of *Matthew* and *Isaiah*, at Dublin; fragments of the Pauline epistles from Mt. Athos; a copy of the Gospels written in silver and gold on purple vellum, the leaves of which are scattered among several libraries; fragments of the *Eusebian Canon;* the Coislin *Octateuch;* and the Vienna *Genesis*.

A new style of Greek uncial writing appears in the beginning of the 7th c., round letters becoming oval and the other letters laterally compressed; the writing slopes to the right, and accents and breathings are introduced. The slanting style continued in use through the 8th and 9th c. These characteristics (except the accents and breathings) are seen in the following fac-simile of two lines from a mathematical treatise of the 7th c. In this MS. the abbreviations are numerous.

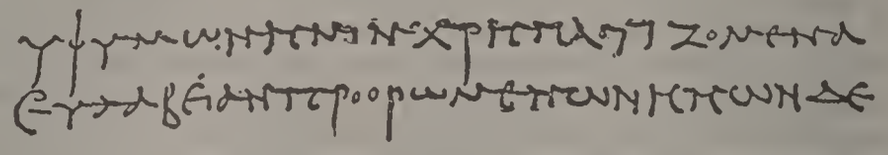


Greek Uncial (Mathemat. Treatise), 7th century.
(πρωτ[ον] μ[εν] γ[αρ] παντ[ος] στερεον σχημ[ατος]
προς τι μετεωρον ευχερεστερ —)

A papyrus in the Imperial Library, Vienna, of A.D. 680, bears signatures in slanting uncials; and the same style is

seen in other MSS. of the same and of later date. In an 8th c. MS., the Venetian Old Test. codex, are a few lines in round uncials, but in a style so labored as to prove the discontinuance of that form of writing. Toward the end of the 9th or the beginning of the 10th c. the minuscule writing was well established and the uncial was in disuse, except for church-service books. The uncial character having thus become in some degree a 'sacred' form of handwriting, the tendency was at once toward conservatism, i.e., strict retention of the forms once adopted and reversion to antique forms, rather than progress in new directions. In this way the sloping uncials become again more upright and rounder.

The cursive uncial writing is seen in papyri discovered in Egypt, and now deposited in the principal libraries of Europe. Till Flinders Petrie's discovery, the most ancient example of the cursive style known as extant was a collection of documents penned by Ptolemæus, a Greek, who became a recluse devotee in the temple of Serapis at Memphis about B.C. 173. A fairly continuous series of writings exists, illustrating the changes in cursive uncial handwriting for several centuries. For the earlier period the papyri are supplemented by the ostraka, or potsherds, on which in Egypt, under the Roman empire, were written publicans' receipts for payment of taxes, etc. A few waxen tablets also remain to show the style of early Greek cursive writing.



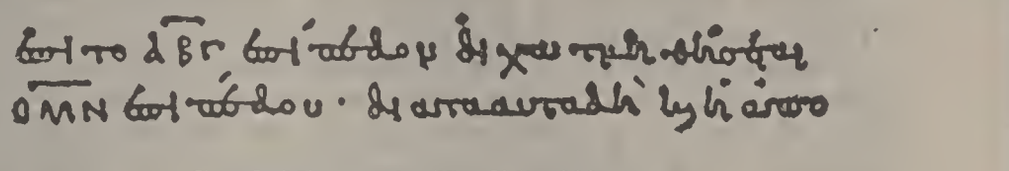
Greek Cursive, 163–162 B.C.
(υφ υμων ημιν χρηματιζομενα
ευλαβειαν προορωμενων ημων δε)

In the above specimen the letters are erect and written with great exactness; in successive centuries they are written with less precision and more sloping. Then, there is more combination of letters, and that necessarily leads to essential changes in the form of the letters themselves, those suffering most change which most readily combine with others. To this class of letters belong the *A*, *E*, *T*, *P* (i.e. the Greek character for our R), *Π*, and *Δ*.

The *minuscule* letters were a natural development of the cursive uncials: they are the source of the lower-case Greek characters at present used in print. But in the process of change from uncial cursive to minuscule, there were some curious transformations. For example the three letters *B*, *H*, *K*, which in their uncial as in their capital forms are quite distinct, had, in the early minuscule, shapes not readily distinguishable from one another; and it is worthy of note that our present lower-case Greek characters *β*, *η*, *κ*, are descended from uncial rather than from these early minuscule forms.

It is different with other minuscule characters, e.g., *μ*, *ν*, *θ*, *δ*, *σ*, *π*, etc., which have undergone very little change since the 9th c. This will appear from the following speci-

men; which, however, exhibits the letter η in a form that has not been perpetuated. It is like the present lower-case η turned upside down, but it is, as η is not, a legitimate minuscule modification of the capital *H* (the Greek letter *eta*):

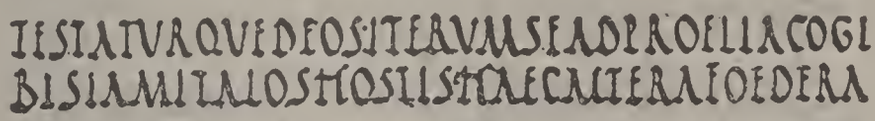


Greek Minuscule (Euclid), 888 A.D.

(επι το $\overline{\text{ΑΒ}}$Γ επίπεδον διχα τμηθήσεται
$\overline{\text{ΟΜΝ}}$ επιπέδου· δια τα αυτα δὴ κ[αι] ἡ ἀπο)

see below in the Pompeian *graffiti* the form of the letter *H*. In this MS. is seen also the disused form of κ, and the reader will notice how closely it resembles η.

Latin Writing.—No ancient Greek writing in capital letters is extant. The use of capitals for book-writing, if ever it existed among the Greeks, having ceased prior to the date of the most ancient papyri that we possess. It is different with the Latin. Specimens of very ancient Latin writings exist in which the letters all are capital, and there are two styles of ancient Latin capitals—the 'square' and the 'rustic.' The difference between these two is, that in the former the horizontal lines are at right angles with the vertical strokes, as in our own capital types; while in the rustic there is less regularity in that and other respects, as appears from the following specimen. Rustic capitals, being more convenient in shape, were in more general use, and most of the MSS. in capitals which have survived are in this character.

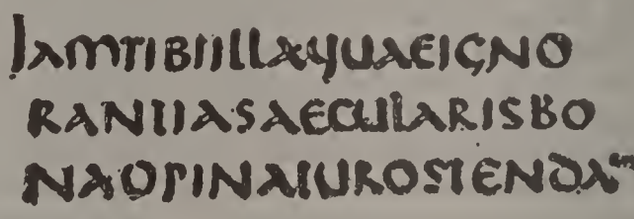


Roman Rustic Capitals (Virgil), 3d or 4th century.
(Testaturque deos iterum se ad proelia cogi
Bis iam Italos hostis haec altera fœdera)

The earliest specimens of the rustic hand extant are the papyrus rolls recovered from the ruins of Hereulaneum, which must necessarily date from a time prior to A.D. 79. Vellum MSS. in this hand are executed with great precision. The large scale of the writing and the extensive surface of a costly material covered by it, must have made works written in rustic capitals very high-priced. There are in the Vatican library 2 copies of Virgil written in this style, neither of them probably older than the 3d or 4th c. No MS. in square capitals is extant of date earlier than the end of the 4th c., the oldest being portions of a Virgil, in the Vatican and at Berlin. Next in date, but much more recent, seem to be the Virgilian fragments at St. Gall.

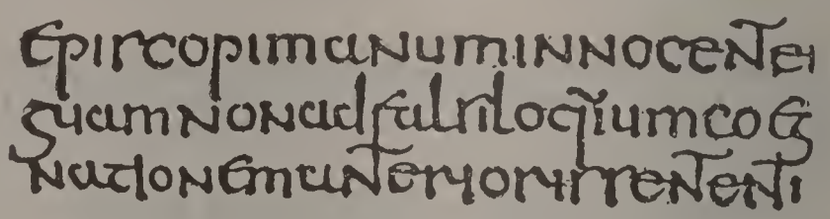
Latin uncial writing differs from the capital in the rounded forms of A, D, E, H, and M, as seen in the accompanying specimen, except that here the bow of the A is in most

places 'blind.' Another point of difference is, that in the uncial some of the letters rise above or fall below the line. The earliest specimens extant belong to the 4th c., and in them the writing is so well-established that we may believe it to have been already practiced for generations. Uncial writing persisted as an ordinary book-hand, till in the 8th c. it was supplanted by the reformed small writing of the Carlovingian school. Examples of uncial writing are the Vercelli *Gospels*, a palimpsest Cicero *De Republica* in the Vatican, and a fragment of a commentary on an ante-Hieronymian text of the Scriptures, at Fulda. All of these are of the 4th c. From the 6th c. are the two codices of Livy, at Paris and Vienna, and the *Gaius* at Verona.



Latin Uncial, 5th or 6th century.
(Iam tibi illa quæ igno
rantia saecularis bo
na opinatur ostendam)

Between uncial and cursive lies the style 'half-uncial.' Apparently as early as the 4th c. a set style of small writing was in use, which partly followed in its formation the characters of Roman cursive writing, while in some of its letters it retained the uncial forms. It appears in marginal notes on some early MSS. But beginning with

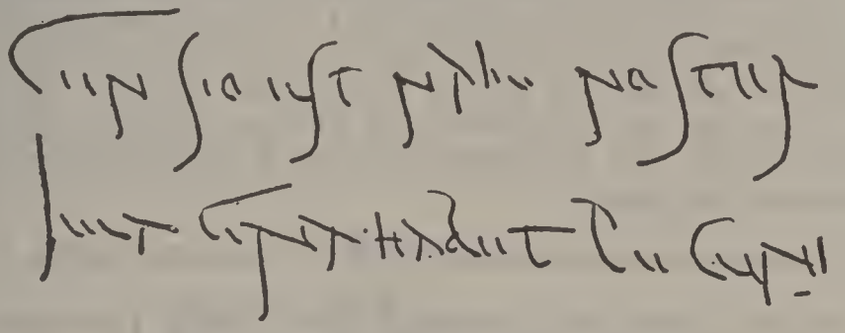


Latin Half-Uncial, 509–510 A.D.
(episcopi manum innocente[m]—
[lin]guam non ad falsiloquium coeg[isti]—
nationem anterioris sententi[æ]—)

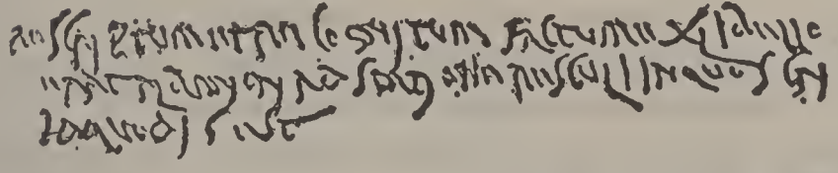
the end of the 5th c. there is extant a series of MSS. written wholly in this hand. In the specimen here given the B, D, M, N, R, and S are seen to approximate in form to the same letters in Latin minuscule writing. The agreements with uncial are patent.

Of Roman cursive writing we possess specimens dating from the 1st c. of our era. In a box unearthed, 1875, in the house of L. Cæcilius Jucundus, at Pompeii, were found 27 *libelli* or waxen tablets containing records of various legal transactions; and at different times, 1786–1855, 25 other waxen tablets, some dating from A.D. 131, were found in ancient mines at Verespatak (anc. Alburnus Major, in Dacia). In both sets of tablets the writing is much alike, and

the forms of the letters resemble those of the more cursive graffiti found on the walls of Pompeii:



Roman Cursive (Graffiti), 1st century.
(censio est nam noster
magna habet pecuni[am]).



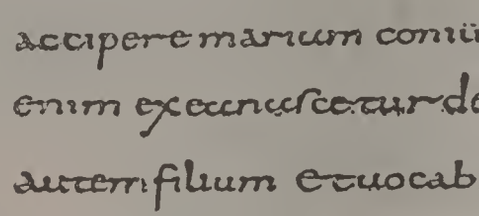
Roman Cursive (Dacian Tablet), 167 A.D.
(descriptum et recognitum factum ex libello—
erat Alb[urno] maiori ad statione Resculi in quo scri—
id quod i[nfra] s[criptum] est)

In this early cursive hand are seen the beginnings of minuscule writing. The slurring of the strokes, whereby the bows of the capital letters were lost and their more exact forms modified, led the way to the gradual development of the small letters. The letter A is formed by a main stroke supporting an oblique cross-stroke above it; so too, P and R, having lost their bows, and F, throwing away its bar, are formed by two strokes placed in relatively the same positions, but varying in their curves. The main stroke of B dwindles to a slight curve, and the two bows are transformed into a bent stroke or loop to the left of the long stroke, so as to resemble our script *d*. This form of B persists in cursive writing till the 6th c. The D resembles the uncial form of that letter; the E is represented by the old form Ⅎ found in inscriptions and in the Faliscan alphabet. The G in the Dacian tablet shows the first outline of the *g* of later writing; in the graffiti the H, by losing the upper half of its second upright limb, comes near to being the small *h*. In the Pompeian tablets (as also in the graffiti) M has the four-stroke form. In the Dacian tablet it is a rustic capital, almost an uncial M. The O is formed by two strokes almost like *a*.

From the date of the Dacian tablets to the 5th c., no specimens of Roman cursive writing exist. Fragments of two imperial rescripts in cursive writing on papyrus are extant, in which are seen the same characters as in the Dacian tablets, with certain differences and modifications; but they are even more difficult to read than the latter. The same is to be said of another fragment dating from 572.

Roman writing of the different styles—capital, uncial, half-uncial, and cursive—became known to the western nations, and formed the basis of the different national styles

of writing, known as the Lombardic, the Visigothic, and the Merovingian. An important influence in determining the ultimate forms of our print and script characters was the reform of writing instituted by Charlemagne 789. The abbey of St. Martin of Tours was the principal centre from which the reformation of the book-hand spread. In the 9th c. the minuscule had attained a degree of elegance and clearness that left little to be desired, as appears from the following specimen:



Caroline Minuscules, 9th century.
(accipere mariam coniugem tuam quod enim ex ea nascetur de spiritu sancto est. Pariet autem filium et uocabis nomen eius Iesum)

From that style to our modern characters, whether script or print, was an easy step.

P. may be said to have been founded by the learned French Benedictine, Jean Mabillon, whose *De Re Diplomatica* (1681, fol.; reprinted 1709 and 89, in 2 vols. fol.) is still, perhaps, the most masterly work on the subject. With the *Nouveau Traité de Diplomatique* (Par. 1750–65, 6 vols. 4to) of the Benedictines of St. Maur, and the *Eléments de Paleographie* (Par. 1838, 2 vols. 4to) by M. Natalis de Wailly, it is the great authority for French paleography. English P. is perhaps less favorably represented in Astle's *Origin and Progress of Writing* (Lond. 1803) than Scottish P. in Anderson's and Ruddiman's *Diplomata Scotiæ* (Edin. 1739). Muratori treats of Italian P. in the third vol of his great work, *Antiquitàtes Italicæ Medii Ævi;* and among later works on the same subject may be mentioned *Diplomatica Pontificia* (Rome, 1841) of Marino Marini. The P. of Greece is illustrated in *Paleographia Græca* (Par. 1708) of Montfaucon. Spanish P. may be studied in *Biblioteca de la Poligrafia Española* (Mad. 1738) of Don C. Rodriguez. Of works on German P. it suffices to name Eckard's *Introductio in Rem Diplomaticam* (Jen. 1742), Heumann's *Commentarii de Re Diplomatica* (Norimb. 1745), Walther's *Lexicon Diplomaticum* (Gött. 1745), and Kopp's *Palæographia Critica* (Manh. 1817). Hebrew P. has been elaborated by Gesenius in *Geschichte der Hebräischen Sprache und Schrift*, and other works. The great work on P. generally —one of the most sumptuous works of its class ever published—is *Paléographie Universelle* (Par. 1839–45, in 5 vols. fol.) of M. J. B. Silvestre.—See BLACK LETTER: CONTRACTIONS: PALIMPSEST: PAPYRI.

PALEOLITHIC, a. *pā′lē-ō-lĭth′ĭk* [Gr. *palaios*, ancient; *lithos*, a stone]: term applied to the earliest portion of the prehistoric stone period. PALEOLITHIC AGE: see PALEONTOLOGY: MAN (*Antiquity of*).

PALEOLOGY, n. *pā′lē-ŏl′ŏ-jĭ* [Gr. *palaios*, ancient; *logos*, discourse]: the science or knowledge of antiquities. PA′LEOL′OGIST, n. *-jĭst*, one versed in.

PALEONISCUS, n. *pā′lē-ō-nĭs′kŭs* [Gr. *palaios*, ancient; Gr. *oniskos;* L. *oniscus*, a millepede]: in *geol.*, genus of fossil fishes belonging to the great ganoid order, with a fusiform body, covered with rhomboid scales, a heterocercal tail, and moderately sized fins, each furnished with an anterior spine. The single dorsal fin is opposite to the interval between the anal and ventral fins. Twenty-eight species have been described from the Carboniferous and Permian measures.

PALEONTOGRAPHY, n. *pā′lē-ŏn-tŏg′rā-fĭ* [Gr. *palaios*, ancient; *onta*, beings; *graphō*, I write]: the description of fossil remains. PALEONTOGRAPH′ICAL, a. *-ŏn′tō-grăf′ĭ-kăl*, relating to the description of fossils.

PALEONTOLOGY, n. *pā′lē-ŏn-tŏl′ŏ-jĭ* [Gr. *Paailos*, ancient; *onta*, beings; *logos*, discourse]: science which deals with evidence of past life on the earth. PA′LEONTOLOG′IC or PA′LEONTOLOG′ICAL, a. *-tŏ-lŏj′i-kăl*, pertaining to Paleontology. PA′LEONTOL′OGIST, n. *-tŏl′ŏ-jist*, one learned in Paleontology.

PALEONTOLOGY: is a branch of Geology, covering all that relates to evidence of life in geologic time, including the study of remains of plants and animals and other records left by them, such as casts or impressions in the rocks, borings, burrowings, footprints, Coprolites (q.v.) and relics of their works.

The materials are very abundant, in varying conditions of preservation or alteration. The great mass of the records is still uncovered and very much has been destroyed by erosion and metamorphism. It is therefore remarkable that the available evidence is so harmonious and so convincing as to leave no doubt of progressive order and system in the succession of life on the globe from its initiation to the present epoch.

Scope of the Science.—Paleontology properly embraces the investigation of everything pertaining to the history of life on the earth down to the Historical epoch. But the scope is usually restricted, in effect, to ante-human periods, mainly because the transcendent interest in human archæology and the pre-historic portion of the psychic era has given rise to special branches of investigation in those fields, and there is another reason for this limitation in the nature of the relics themselves. Paleontology is concerned for the most part with mute, or involuntary, records, whereas the sciences relating to man's occupation of the earth have to do more often with relics illustrating volition or results of design. Even this restriction does not suffice to narrow the scope of

paleontology to the limits set by the capacity of a specialist. Hence it follows that experts in the science are compelled to devote their lives to particular divisions only. No living paleontologist is to be regarded as an adequate authority in all departments of the science. Thus one may be versed in vertebrate, another in invertebrate paleontology, another in fossil botany, or in one or other of more limited specialities, dependent upon the attitude of the investigator to the problems presented. In invertebrate paleontology, workers usually restrict themselves chiefly to life of a single geologic period or to the study of the growth and development of one class of animals or plants through the whole geologic record.

Relations to other Sciences.—Beginning necessarily as a mere record of disconnected facts, followed by an epoch of tedious definition, comparison and classification and laborious adjustments of synonyms, this science has grown apace with the brilliant achievements in biology, until it has now become also the support as well as the disciple of those sciences which deal with the philosophy and economy of life.

From the standpoint of the systematic botanist or zoologist the paleontologist seeks evidence of types in the form of organic structure existing together in the different geologic epochs. As a geologist, he is concerned with the relations of generic and specific types to the chronologic sequence of strata. Out of this line of study an almost distinct branch of the science has been developed. This deals directly with the geographic distribution of life in particular epochs, as affected by geologic events, and indirectly with the changes of land and water areas by which such distribution has been influenced. Viewing the records from the outlook of the biologist, it is essential to study the evidence relating to evolution and decadence of organic types, and this has led to important discoveries in what might be aptly termed paleo-embryology. Finally, the legitimate outcome of paleontologic study must be the accumulation of evidence bearing upon psychological problems as well as the more material sciences. As to the results of enquiry to date along the lines indicated, only the most general statements are possible here.

Methods of Study.—It is necessary to bear in mind two guiding principles which were not sufficiently regarded in the early history of paleontology. *First*, the life record is to be read, not vertically in the rocks, but by wavy lines representing geographic alternations of shorelines, indicating 'cycles of deposition;' and *Secondly*, introduction, culmination, decadence and extinction of types, as in all history, mark salient points of departure for grouping the facts in evidence. A common popular error is the notion that evolution has caused a gradual elevation of one type only from primordial plasm to homo. On the contrary, types of lowest forms have existed in all geologic periods, since the beginning of life on the earth,

and while struggle with environment has produced progressive development along a number of lines, the complete record would appear like a genealogic tree, in which living families of the later epochs are so widely separated as to obscure evidence of common ancestry.

Introduction of Life on the Globe.—Paleontology may justly enquire into the origin of life, in so far as the earth record affords definite evidence. But it may be doubted whether much evidence has been preserved among the remnants left from the metamorphism and possible fusion of the strata of the earliest era in which conditions were favorable to the existence of life. Moreover, some of the lowliest forms now living are not adapted for preservation even under the most favorable conditions. But again, other forms but little removed from mineral aggregates in their earthy parts have been for ages and are now accumulating rock masses which reveal their origin even after subjection to intense heat or after complete replacement of their substance by reaction from solution.

Earliest Records Uncertain.—In the present state of knowledge, it is impossible to define a precise period for the introduction of life, nor can the materials at command yield absolutely certain evidence of what is reasonably deducible, from physical, chemical, embryological and other data. The occurrence of abundant deposits of limestone, iron ores and graphite in Archeozoic rocks, now altered beyond hope of recognition of any included organic forms, is generally regarded as substantial proof of the existence of vegetation and of animal life in this era.

EOZIC ERA—AGE OF RHIZOPODS.

Earliest Forms Recognizable.—In 1863, the Canadian Geological Survey announced the discovery, in serpentine limestone of Laurentian age, of a supposed Foraminifer, named *Eozoon Canadense.* Since then these rocks have yielded much evidence of life at that period, including many unidentified fragments of limestone-forming animals and carbonaceous material indicating coexistent plant growth. A few years later in Brazil, in the Archæan rocks of the Amazonian Valley, Ch. Fred. Hartt discovered similar fossil remains and equivalent evidence has accumulated from the study of early strata in different parts of the United States, Bohemia, Bavaria and elsewhere. Some recent authorities completely ignore the claims made for animal structure of Eozoon and deny actual discovery of any organic form in Archæan rocks. But there is no contest over the probability of the existence of both plant and animal life in considerable variety before the close of this Archeozoic Era.

Proterozoic Era.—The Algonkian (Proterozoic) era was undoubtedly life-bearing. Besides evidences such as are afforded in Archaean rocks, undoubted fossil remains of advanced types occur in strata parachronous with the Huronian of Canada, in parts of America and Europe. Although these relics are few, as now known, they repre-

sent Molluscs and Crustaceans (some worm tracks) of high grade in their respective classes. This fact implies existence at the same time of other forms upon which their subsistence depended. And all the facts bearing upon evolution of life indicate, at least hypothetically, that more lowly ancestral forms had previously existed.

EARLIEST PALEOZOIC ERA—AGE OF INVERTEBRATES.

Cambrian Period.—In the Cambrian period of Paleozoic time, marine life was rampant. From good ground outside of the actual preservation of remains, it is inferred that plant life had become abundant, but the paleontologic evidence of this is very meager. Such remains as are known are not of high type. But all the sub-kingdoms of invertebrate animal life were represented thus early. And it is significant that, although many such types have since become extinct, the later evolution of these classes, or their divergence *inter se*, has been moderate in comparison. The geographic and stratigraphic relations of faunas of this period are so consistent in different parts of the world that great discordance in climate is not to be inferred. Trilobites show considerable development in three well marked stages corresponding to successive stratigraphic horizons, in many localities. Paleontologists have been able to make most interesting and profitable deductions from the study of this life period, regarding environment and the gradual development of community defense and individual sagacity among animals.

Ordovician Period (*Lower Silurian*).—In the Ordovician period further progress was evinced by differentiations adapted to more local environment and by the segregation of zöological provinces. Trilobites progressed and reached their culmination; Brachiopods were most abundant, and Cephalopods excelled in strength. Land plants are known, but little evidence is in hand of extensive growth, although such probably existed, as remains of flying insects have been found in Sweden. The earliest known vertebrate remains, of fish-like type, occur in rocks of this period, near Canyon City, Col. In Europe, and perhaps in less degree in Asia, much the same life-history is illustrated. Very marked development had resulted before the close of this period, as shown by the introduction of the vertebrate type.

Silurian (*Upper Silurian*).—Silurian life in North America was subjected to regional oscillations of sea-level which materially affected development of marine organic forms. In the early epoch of transition from Ordovician conditions, extinction of some types occurred through the restriction of the area of shallow water over a large part of the region. By enforced migration, a few forms were enabled to survive until the later engulfment in the Middle Silurian epoch, and others even existed in late Silurian, which was another epoch of restriction, The mid-Silurian fauna was prolific, and much like the Ordovician in general type, but largely of new genera. Characteristic Brachi-

opods were numerous, Cephalopods dominated the sea, Echinoderms waxed to their culmination, Trilobites declined and Vertebrates (fishes) increased in importance. Plant life, which must have been plentiful, has not been well preserved. The distribution of life in American and foreign waters was still more specialized than before. The sea connection was most free between the interior of North America and northern Europe, where life forms were similar. The Late Silurian fauna was again restricted with peculiar types suggesting brackish water environment. Huge Crustaceans (Eurypteri) were abundant in the U. S., Great Britain, Sweden, and Russia. Allied types were the Scorpions, first known here, some of which may have been land denizens. Fishes of peculiar type and transitional forms of Ostracoderms became more prominent in this epoch.

LATER PALEOZOIC ERA.

Devonian Period—Age of Fishes.—The Devonian period in North America was characterized by an expansive evolution due to re-encroachment on the land by the sea. The advance of the waters was through several projections, or gulfs, from different points along the earlier border. In these prolongations the evolution of life was influenced by local conditions of depth, character of land surface, sedimentation from erosion and indigenous forms of life, as well as by the character and supply of plant food. Thus five marine faunas have been recognized as measurably distinct, representing epochal succession, so far as their incursions to the Interior Basin are recorded. These have all been studied in much detail and the geographic distribution shows close, but differing relations with distant areas. We can only touch upon the general Devonian facies as it affects the evolution of types. In the earliest Devonian, a late Silurian aspect was prevalent, but with changes in details, as well as new features which foreshadowed the late forms of the period. After this transition epoch there was a great development along lines before represented by the Ostracoderms (practically connecting type between Crustaceans and Fishes), through an extinct order of fishes having comprehensive characters, to forms of true fishes, even approaching modern types. As a rule, these animals were heavily armored and of massive proportions. There were aberrant forms of Trilobites suggesting a tendency to mental development as a foil to dangers of encounter with such formidable opponents. But, in the end, brute strength prevailed and these and other weak combatants became extinct. Before the Trilobites and some other contestants gave up the struggle there were notable instances of changes along other lines for protection, as by the development of spines, granules, etc., and by ornamental effects perpetuated presumably on the principle of mimicry, or perhaps by sexual selection.

In the late Devonian waters there occurred a commingling of indigenous and exotic types due to breaking down of barriers and sea incursions. Probably this disturbance of conditions unfitted the water for much of the higher life which abounded in the less turbid seas of earlier date. Brachiopods, numerous throughout the Devonian, diminish in variety and are less characteristic than before. Fishes are more rare in marine deposits, but evidence of the existence of fresh water types of peculiarly Devonian aspect are abundant. Plant life of this epoch has been better preserved than in earlier formed strata. The forms known are suggestive largely of the following period.

Carboniferous Period. The age of Amphibians.—The Carboniferous period, like others preceding it, has been named from near-shore deposits. These yield the best paleontologic evidence, because the deep sea areas little affected by alterations of level, afford less scope for life and consequent evolution through struggle. The development of life on land and in water was also greatly influenced at this period by more extensive upheavals and subsidences resulting, on the average, in land growth and the deepening and narrowing of the ocean. The outcome, in succeeding epochs, gave rise to provincial distinctions, although cosmopolitan life relations were not seriously disturbed until much later periods of aggregate continental elevation. The Carboniferous strata extended more widely than those of the known Devonian, but they are more differentiated into zones. In Western North America, the deposits are mainly limestones of deep water type, while the eastern strata show more gradual approach of similar conditions through long epochs of marshy and shallow water sedimentation. Parallel differences in faunas are evident, and there are consequently more difficulties in correlating the strata of widely separated exposures. In the eastern U. S., in portions of Europe and elsewhere, Devonian aspects continue, with gradual expansion, into the Coal Measures; in the Mississippi Valley, a considerable development of Sub-Carboniferous limestones follows a type of Devonian, where this is present, which itself had already foreshadowed the change. Farther west, where Devonian types are of more doubtful occurrence, the transition from Silurian to Upper Carboniferous is usually more abrupt, although instructive exceptions indicate diminished necessity for struggle.

The remarkable uniformity of type in the life of the Carboniferous of different regions indicates the existence at the time of world wide climatic features. The restriction of both plant and animal life to types adapted to the peculiar atmospheric conditions admirably illustrates the controlling influence of environment upon evolution. Owing to the murky and highly carbonated air, the specially fitted amphibian group and a distinct class of plants dominated sea and land. The development along these lines, as viewed from the present outlook, afforded marked examples of comprehensive types, continuing dormant

features of life and foreshadowing advanced types of post-Carboniferous origin. Both plant and animal forms were gigantic and well protected to resist attack. The animals were fitted for offensive and defensive warfare by hard parts, ugly weapons or means for evading pursuit. Labyrinthodonts, the lowest order of Amphibia, becoming soon afterwards extinct, in their Carboniferous representatives connected fishes and reptiles. Acrogens and Conifers, in similar manner, were of forms of low type in their class, connecting ferns and club mosses with higher types.

Sub-Carboniferous Epoch.—In the Mississippian (Sub-Carboniferous) epoch in the U. S. there was a continuance of Devonian provincialism in the sea, with little extension of land faunas, so far as known. In Europe the advance towards a distinctively Carboniferous aspect is at least more in evidence. Interesting culminations and decadences in marine forms are shown in the moving of the Crinoids to their climax and later decline, the sparce occurrence of Corals, the early importance of Brachiopods, followed by reduction in size, the general subordination of the Mollusca, the gradual evolution of the fishes, with the disappearance of the Ostracoderms.

Coal Measures.—The Epoch of the Coal Measures was notable from the abundance of plant life, whose relics form vast coal deposits in Pennsylvania and many other parts of the world. Pteridophytes, the group comprising ferns, horse tails, club mosses, sphenophyllum and allied forms, were at their best in size and variety. The Lycopodiales (club mosses) were the dominant group in which the genera *Lepidodendron* and *Sigillaria* were especially prominent. Like these and some fern-like forms, the Cordaites illustrated another comprehensive, or connecting type, now extinct. This was of the family of Gymnosperms. Angiosperms of this early date have not been discovered.

The animals of the Coal Measures show progress in certain directions, but this was less pronounced in marine forms than with fresh water and land denizens. Fishes became less sluggish and clumsy and more comely in figure. Amphibians were differentiated into five well marked sub-orders of Labyrinthodonts, each with particular and different aspects of connecting types. As might be expected from the atmosphere, insect life grew rampant, half a hundred distinct forms having been described from both European and American localities. Orthoptera, as inferentially proper, were the dominant group, with Neuroptera, Hemiptera and Coleoptera in goodly number and sometimes of remarkable form and large dimensions. Spiders, myriapods and scorpions were well represented, also. Several forms of land snails have been described.

Permian Epoch.—The Permian epoch was characterized by important changes, including extinction of much of the life of the Coal Measures and the decadence or recast-

ing of a large part of the remainder. In other words, in foreign parts as well as in America, with differences mainly in order and degree, there were several climatic modifications, extending to glacial conditions, which could not but rigorously and depressingly effect vital entities. Only the very fittest could survive these exigencies. Consequently the record shows paucity of life in the Permian everywhere. But, as in other like instances through geologic eras, there was an induced evolution of surviving types along new lines. This gives Permian life a distinctive aspect otherwise unattainable. Thus, in the flora, the Glossopteris type of ferns, and the associated compact, simply outlined forms of horse tails and Conifers, were developed as best adapted to withstand the untoward conditions.

In the animal life of the Permian there are good illustrations of equivalent adaptation to environment, in marine evolution as well as in development of fresh water types. Trilobites and Eurypterids became extinct, square shouldered Brachiopods, Orthoceratites and Goniatites remained. Fishes and amphibians show but little change except gradually diminishing numbers, until the climatic changes had become pronounced. Then, as with the sea inhabitants, more resistant types ensued. The Amphibians were slowly differentiated and gradually declined, giving place to types illustrating or foreshadowing the oncoming Reptilian period. Among them were true reptiles of low grade, but possessing comprehensive features between Amphibia and Mammalia. In various aspects, including life issues, the Permian marks transition from Paleozoic to Mesozoic times. Its strata represent all or a part of the chronologic interval commonly exhibited in the unconformity between the rock-formations of these two great eras. The distribution of land areas, in consequence of the so-called Appalachian uplift, or in spite of it, is very significant. Gondwana land (of Suess) was formed during the Permian, as a great continental area, uniting Antarctic land with Australia, South Africa and South America. The Appalachian, Canadian, Ouachita and interior western ranges arose in North America and corresponding movements affected portions of Europe and Asia. Thus were prepared new seas and new lands as theatres for the life struggles of the succeeding era.

Mesozoic Era—age of reptiles.

The Mesozoic era brought to culmination the Cycads among plants, Cephalopods in marine life and Reptiles upon land.

Triassic.—In the Triassic period, where it is distinctly recognized, Tree Ferns, Cycads and Conifers were the characteristic plants. Brachiopods had declined decidedly, Cephalopods of new types began to appear, Insects were more specialized. Labyrinthodont Amphibians culminate and disappear, reptiles, large and of low type, but

with hints of mammalian structure, are characteristically Triassic. These are known from Germany, France, Great Britain and South Africa. In North America the Triassic is not always readily separable from the strata of the following period. Here the so-called Jura-Trias has yielded meager evidences of plant life, with beds of coal in Virginia and North Carolina.

In the Connecticut Valley, tracks of insects, crustaceans and reptiles are abundant. In the west, in Colorado, Wyoming, New Mexico, etc., better separation of the two periods is possible. In this region very much material has been worked up by Marsh, Cope and Leidy, resulting in the description of numerous forms of gigantic Vertebrates, comprising reptiles and a low order of Mammals of comprehensive type.

Jurassic.—The Jurassic period afforded favorable climatic conditions for expansive evolution. There was a partial return of Carboniferous aspects, limited in space and time, with differing results measured by the grade of existing life. This was the period of culmination of Mesozoic types. Coral reefs in Great Britain, the Jura Mountains and elsewhere left relics in large accumulations of öolitic limestone produced by their alteration through the agency of Algæ (q.v.), it is believed. Coal deposits of commercial value in England, Scotland, China, India, S. Africa, Australia and probably those of N. Carolina and Virginia, were accumulated at this time. Gymnosperms now took the place of the Acrogens of the Carboniferous coal-making period. Fernlike plants, now believed to be connecting types between ferns and Angiosperms, were characteristic of the Upper Jurassic.

Lamellibranchs (q.v.) had become conspicuous without supplanting Brachiopods, the oyster first appearing here. Cephalopods took high rank, as Ammonites and Belemnites, the latter representing a modern type introduced in the Jurassic. The Crustaceans had advanced gradually to the grade of the crab. Insects of the higher forms were introduced, though beetles were most numerous. Sharks declined in the lowest order (Cestracionts) culminated in the middle grade (Hybodonts) and introduced the modern Order of Squalodonts. Ganoid fishes foreshadowed, in their Jurassic representatives, the higher order to follow. Reptiles became dominant in number, variety and as rulers in seas, on land and in the air. *Swimming Reptiles* (Enalosaurs) were: Ichthyosaurs, connecting fishes and reptiles; Plesiosaurs and Pliosaurs, approaching land reptiles in form. Then came Crocodilians, some combining features of the lower type with those of the Crocodiles, others of true crocodile character. *Land Reptiles* (Dinosaurs) included the largest ever known, and of the highest type, possessing comprehensive features relating them closely to mammals and birds. Some were Carnivorous, others Herbivorous. Among the largest and most interesting Dinosaurs are those from the later Jurassic beds of Wyoming. One, however, was

smaller than an ordinary Bantam fowl. Marked characteristics, among many variations in structure, were the tendency to erectness in pose and the usually diminutive brain cavity, and these qualifications apply equally to European and American examples.

Flying Reptiles (Pterosaurs) of most extraordinary mien were abundant. The most common examples are the Pterodactyl,—a bat-like reptile, tailless,—and Rhamphorhynchus, similar in appearance, with long tail.

The most striking of all the marvelous manifestations of Jurassic life is the comprehensive type exemplified in Archæopteryx, a genus of reptilian birds. These animals had feet and feathers and general aspect of the bird, combined with the long vertebrated tail and toothed jaws of a reptile. Marsh also discovered remains of another genus of similar combined types—in the Wyoming Jurassic.

The Jurassic Mammals were more differentiated than in the Triassic, but not advanced far enough to obscure their reptilian ancestry. They were small, not active competitors with the giant Dinosaurs, of a grade between Marsupials and Insectivora, or possibly of types representing the beginnings of both these groups.

The Sierra Nevada uplift and other earth movements along the Pacific Coast, with igneous outbursts on the Atlantic side and incipient mountain elevation in the western interior, closed the Jurassic period and inaugurated the conditions which confronted life in the Cretaceous. The Later Jurassic, in Europe and America, was a transition epoch during which life gradually developed types foreshadowing that which became dominant in the succeeding era. As illustrations of this feature, plants were represented by unicellular forms in marvelous abundance, associated with Ferns, Cycads and Conifers of Jurassic mien, and with true Angiosperms besides the connecting type (Pro-Angiosperms) which was continued from upper Jurassic into Lower Cretaceous.

Cretaceous.—Very prominent features of the Cretaceous, from which its name is derived, are the enormous deposits of chalk which occur in England and in parts of the U. S. (Texas, etc.). This rock is composed almost wholly of calcareous shells of Foraminifera, the siliceous spicules of sponges and the remains of Protophytes (one-celled plants, as Desmids, Coccospheres, etc.). Echinoderms exhibit advanced features, the Echinoids being the representative group. Lamellibranchs begin to overreach the Brachiopods, the oyster family taking the lead. Gasteropods, a very slow advancing group, now take on modern characteristics. Cephalopods are still represented by Ammonites and Belemnites, but these gradually become extinct in this period, their decline being marked by aberrant forms emphasizing the struggle against fate. Crabs continue the Crustacean line. True Teliosts, the higher order of fishes now living, are first recognized in the Cretaceous. The lower orders continued,

but certain low branches did not pass beyond into the Cenozoic era. Reptiles were still dominant, showing some advance in type. The new group of Mosasaurs was exemplified in marine, serpent-like forms of extraordinary length. Turtles were large and numerous. Large land reptiles continued, with a tendency to greater erectness of position. American Pterosaurs show still more advance to bird types, in the toothless and horny sheathed jaws. At the same time there were other types, with real bird characteristics in figure and general skeleton, but with vertebræ and toothless jaws of structure akin to reptiles and even fishes.

The first Birds were of aquatic habit. Mammals are almost unknown from Cretaceous strata, but Marsupials or their allies of the Jurassic must have continued, as some are living to-day in Australia. Probably the changes in physical geography enforced migration to parts of the earth where the rocks of this period have been but little investigated. Near the close of the Cretaceous, in the Laramie epoch, or its equivalent, extensive coal fields were accumulated in the region of the plains and the Pacific Coast area. Lignitic coals also occur of this age in Northern France, in India and elsewhere. The Laramie beds in Wyoming are so transitional in their relations that they have not yet been indisputably ranked as Cretaceous. The plants are of Tertiary types, in a measure, but the animal remains illustrate decadent phases (aberrant forms) of reptilian development with bird-like characters, and mammals of transition types, of Mesozoic aspect. Along with these have been found the bones of true Mammals, however.

Cenozoic Era—age of mammals.

The Cenozoic era was ushered in very gradually in parts of North America, but the record is usually abrupt in Europe. The post-Cretaceous revolution in the western U. S., marked by the elevation of the Rocky Mountains, was of continental proportions, resulting in climatic changes of moment which had great influence upon life evolution.

Tertiary Period.—The Tertiary period continued the gradual formation of climatic zones begun in the Cretaceous, and henceforth the development of plant life in different areas diverged. Australia still retains an early Tertiary flora by reason of its isolation; America has late Tertiary features in its present flora, and the living plants of Europe are largely of more recent type, although all were practically identical at the close of the Mesozoic era. Infusorial earths, occurring in Virginia, California, Bohemia and other regions are common in Tertiary deposits. These are made up of the siliceous remains of Diatoms, a group of unicellular plants. Tertiary lignite-beds are of sufficient extent, in Europe and America, to support a thriving industry. Palms were prominent in European Eocene and many of the now common

fruit and other deciduous trees had appeared as early as the Miocene and Pliocene epochs.

The study of the animal life of the Tertiary is of absorbing interest, but we can merely glance at it now. Its salient feature is the entire absence of many of the earlier groups, which became extinct during the Cretaceous period. Invertebrates were largely of genera now living, in many instances of the same so-called species, also. Enormous deposits of limestone, made up of the shells of Foraminifera (Nummulites) have become famous in Europe, Asia and Africa, the Egyptian deposits having been quarried to build the Pyramids.

Animals with bivalve shells (Lamellibranchs) were of modern types, the oyster family culminating in mid-Tertiary in forms of great size. Other Molluscan tribes had reached the modern stage of development. Insects, including the highest orders, were numerous. Ants, which first appeared in the Tertiary period, were all winged, a circumstance of much import in the evolution of this type. Modern fishes (Teliosts) were abundant, modern sharks culminated. Amphibians of higher order, including frogs, became prominent, and reptiles were represented by snakes, turtles, lizards, and crocodiles. The gigantic reptiles which were rulers in Mesozoic times had become extinct and their superior successors were dominated by birds and mammals. The birds were both aquatic and terrestrial, the older type of reptilian birds being wholly extinct at this period. But still the birds were of comprehensive type to some extent. Real toothed birds had disappeared, but the Odontopteryx had a serrated bill of similar use. Another bird (Gastornis) combined features of the waders and the ostriches. In S. America an enormous bird (Phororhacos) not adapted for flight, carried a head larger than any living land animal except the elephant, hippopotamus and rhinoceros.

The Tertiary Mammals present many enticing features which must be hurriedly passed over. Although largely of generalized types, they show great advance over known Mesozoic examples of this sub-kingdom. And yet it may be possible by patient study to connect them into one earlier ancestral line, if we follow their genealogy through changes in physical geography and resultant migratory movements. Zittel contends that, if living to-day, without our knowledge of the later evolution, we would include them all in the same family (say Eutherium of Huxley), although they foreshadow and really represent the four main divisions of the class, including Primates.

The material collected and described by Cuvier and Flower from Europe, Falconer from India, Ameghino from South America, Lyell from Great Britain and North America, Marsh, Leidy and Cope from Western U. S., and by other authorities, is so vast and so overwhelming in its significance that the task of epitomizing the evidence satisfactorily is most formidable. Some striking illus-

trations follow, but the reader must be referred to the text books and to special technical works for the details upon which the conclusions here given are based.

Eocene Mammals.—In the Eocene, or early Tertiary epoch, in Alabama and other parts of the U. S., gigantic skeletons of an extinct whale are abundant, with remains of walruses and other allied animals. A variety of tapir-like forms of Pachyderms predominated. Of 50 mammals described from the Paris Eocene by Cuvier, 40 were of this type. One (*Palæotherium*) had features of the tapir, rhinoceros and horse combined. Another (*Anoplotherium*) formed a connecting type between the tapir and the ruminants. Still another (*Coryphodon*), in Wyoming, described by Cope, comprised features of tapirs and bears. Perhaps the earliest ancestor of the horse (*Eohippus*) was found by Marsh in equivalent strata. This animal was no larger than a fox and had feet with 3 (hind) and 4 (fore) hoofed toes, with vestiges of an extra toe on each foot. From higher Eocene beds came *Orohippus*, of about the same size, but with vestigial toes obliterated from the feet.

The Order Tillodontia includes animals combining the head and claws of bears with the incisors of rodents and other characters of Ungulates (herbiverous hoofed animals). The large *Dinoceras* and *Tinoceras* had elephantine bodies without proboscis, with canine tusks, three pairs of horns and very small brain cavity in proportion to size. The order quickly became extinct as the evolution of this epoch began to minimize the superiority of brute strength. But there were carnivorous forms allied to the fox, wolf and cat, besides marsupials, moles, squirrels and bats; Herbivores dominated the Eocene, however. Monkeys of generalized type, leading up to the Lemurs and Marmosets, represented the Primates.

Miocene Mammals.—The Miocene had a fauna distinct from the Eocene in species, and most of the genera and some of the families became extinct prior to this middle Tertiary epoch. Turtles and rodents were abundant. Tapir-like forms of mammals survived, the cat family was represented by panthers and tigers, and members of the deer, camel, horse, rhinoceros and dog families were added. Several genera of remarkable animals, grouped by Marsh in the family Brontotheridæ, were the most notable animals of this time. They were of great size, combining head and body characters of the rhinoceros with the feet of the tapir, among other peculiarities. With these were members of the rhinoceros family. In animals of sheep size, with three toes on each foot, fore and hind, known as *Mesohippus* and *Miohippus*, further development in the horse family is exhibited. *Oreodon*, combining features of deer, camel and hog, was an abundant genus in America. The saber-toothed tiger was first known in the Miocene. America and Europe, united in the Eocene, as indicated by the common flora and nearly parallel fauna, were probably separated about the date of the

Miocene. The American mammalian fauna was much different from that of the same epoch in Europe.

Pliocene Mammals.—Pliocene life was characterized by the extension of mammalian families now living and the introduction of living genera, but no recent species are known. The special representatives of the families of rhinoceros, elephant, mastodon, camel, horse, deer, wolf, fox, tiger, beaver and porcupine lived with remnants of *Oreodon,* and these were abundant in both Europe and America, indicating renewed connection of the two continents. The horse family, probably originally developed in America, was of higher grade than before, but not up to present type. *Protohippus* was still 3 toed, but only the middle hoof was of essential use. *Pliohippus* had a single hoof like horses now existing. These were larger than the earlier types, but still below the horse in stature. The modern genus *Equus* was developed before the close of the Pliocene, but not to present forms.

Pleistocene Period (*Transitional*).—Quaternary (Pleistocene) life was again of revolutionary aspect, due to change of climate induced by elevation of land in polar regions. Migrations, restrictions of feeding grounds and other vicissitudes enhanced the struggle for existence, and thus the small brained, massive animals of the Tertiary were thrown into competition with the physically weak, but more agile types, whose necessities sharpened their senses and developed brain capacities.

The Glacial period is now understood to have compassed a series of oscillations of climate caused by alternating incursions and recessions of the glacial blanket. Eleven such advances and retreats, all told, have been clearly defined by Geikie in Europe and 13 are definitely recognized by American geologists. Aside from exceptional, comparatively local, entombments from sudden freezing or thawing, the general effects upon land life were reflected in migratory transfers of feeding grounds, forward and backward, from south to north and *vice versa.* Thus were encountered varying conditions of food supply, of exposure to enemies and of menace or protection by physical environment. There was great contrast in the life of the far north and far south, in the areas subjected to glacial action, and that of the region between, on both sides of the equator. In the higher altitudes of colder climate, such rugged, massive, resistant types as the elephant (mammoth) mastodon, musk-ox, large saber-toothed tiger, cats, bears, wolves, peccaries and the *Casteroides* (a powerful beaver) disputed sway with Buffaloes or drove them from the region. These followed closely the in and out movements of the ice cap. In lower latitudes, where by reason of higher temperatures, the life struggle for sustenance was less urgent, the sloths, armadillos, etc., were abundant. Perhaps because of alternating incursions of the more ferocious northern types, these also were of immense size and protected by heavy armor.

Asia and Africa passed through similar transpositions and the general effects of evolution, so far as known, were about the same as in America. Australia, previously cut off from the Eurasian continent, and therefore undisturbed by inimical associates, presents a remarkably convincing illustration of arrested development. Monotremes and Marsupials, the lowest of Mammals, have continued there as dominant types to the present day. South America offers a problem which will require more investigation for settlement. The evolution of its fauna suggests the possibility that some portion of what is there now regarded as Pleistocene may have been of Pliocene age.

Man's presence in the Pleistocene is not generally conceded. The evidence comes almost wholly from 'artefacs,' such as flint flakes and chipped fragments of various rocks. These are not certainly referable to the Quaternary, even when their great antiquity is apparent. In Europe, there are stronger claims than perhaps in America. This comes from the association of Quaternary mammalian remains, in caves, with relics of man's occupancy and even of his rude drawings of such animals. But there is some doubt whether these finds are really as old as the Pleistocene. Certain presumptive evidence is there which leads the majority of the authorities to infer that man did really appear toward the close of the Glacial period.

Psychozoic Era—age of man.

Recent Period.—The Human period, or that of the present, is not sharply defined in its incipiency. There may even be doubt whether we have yet passed beyond a retrocessive stage of the Glacial period. The dominancy of man is by itself characteristic enough of a separate era in evolution; for the growth of brain power has completely revolutionized anatomical development, by elevating a type fit to cope successfully with brute strength and protective armor, and this without retention of bodily weapons, resistant covering, over keen senses or means of facile escape. Mind has become preëminent, and at this stage the paleontologist leaves to the archæologist and his host of compeers in cognate sciences the willing task of tracing out the pedigree and the path of still struggling man adown the periods of history.

General results of investigation.

Passing in review the outcome of paleontologic investigation to date, and forecasting as well as we may the results liable to accrue from further exploration, it is important to preserve clearly the distinction between fact and speculation. At the same time there is a vast difference in the practical value of inferences drawn by one familiar with the facts and of wholly speculative suggestions based upon hypothetical grounds. We are fully warranted, therefore, in accepting the doctrine of gradual evolution of types, and the genealogy of great groups of plants and

animals may be depicted with surprising precision, considering the scattered and fragmentary nature of the evidence. There can also be no doubt of the causes, in general, which have determined the direction of lines of development and the withdrawal of certain types, at intervals. The persistence of inferior types may even be explained in some detail, and a certain law of progress may be defined, provided that the limiting conditions be strictly regarded. That is to say, a competent paleontologist should be able to predict, with fair degree of accuracy, the logical successors of the comprehensive types of a given period, from adequate knowledge of all the features of environment, including physical geography and life associations. Hence the science of paleontology is built upon more solid foundation than mere examination of skeleton remains. Its recent advance in importance has been due largely to the close attention by its votaries to concomitant evidence of the surrounding circumstances. The fruits of the tree have been late in coming, simply because earlier investigators neglected these clues and failed to perceive the paramount importance of reasoning from fact to theory instead of adopting the reverse method. Still further may the skilled paleontologist go in reasoning from analogy where gaps in the evidence occur. Remarkable instances might be quoted of such generalization afterwards proved correct by results of exploration. In the case of man's early record on the earth there is much discussion which, from necessity, must still partake of this tentative quality.

This brings us abreast of the really controversial problems, which come not so much from hiatuses in the known facts as from present inability to interpret the facts themselves. Here enters the element of speculation, with attendant dangers dependent measurably upon the degree of qualification of the author thereof. Forecasts of eminent paleontologists are entitled to credence in proportion to their relations with ascertained facts. Speculations of untrained compilers possess little or no value. Furthermore, the fundamental hypotheses of geology appear just now to be in a state of revolution, and any movement of this kind must exert an influence upon paleontology and, eventually, *vice versa*. Already certain of the results of paleontologic research, as herein outlined, have been used in confirmation of radical revisions of geologic theory. Harmonizing concepts of this character are suggestive of truth in the conclusions on both sides. The real problems have been much reduced thereby. Still there remain difficulties some of which may be removed by exploration in the large fields, but little known, in South America, Asia and Africa. Inaccessible tracts now covered by the sea probably lock up much of the evidence, and there are gaps in the geologic record which may be eliminated through contemporary records not now defined. But, by reason of the lack of preservation of undoubtedly enormous quantities of the earlier denizens

of the globe, and the denudation or metamorphism of immense areas in which presumably vast numbers have been destroyed, and from other causes, there are doubts whether much of the history will ever be worked out. Notwithstanding all this imperfection so much has been clearly proved by the modicum of evidence heretofore available that great hope may be indulged regarding the results of future discoveries. In many groups of the animal kingdom the family trees have been traced back far enough to definitely determine the points of departure from common ancestry, and in many others this method of investigation has yielded reasonably precise indications of what may be anticipated when the missing links shall have been found. It is one great step forward in any science when, as in this, the proper lines of investigation have been clearly indicated.

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PALEOPHYTOLOGY, n. *pā′lē-ŏf′ĭ-tŏl′ŏ-jĭ* [Gr. *palaios*, ancient; *phuton*, a plant; *logos*, discourse]: the science that treats of fossil plants or vegetable remains—a branch of paleontology.

PALEOPYGE, *pā-lē-ō-pī′jē* or *păl-ē-* [Gr. ancient rump]: genus of fossil Crustacea, founded on a single impression from the surface of a bed in the Longmynd, of Cambrian age. Salter believes it to be the cephalic shield of a trilobite, but it may be only an accidental marking. If it be the impression of an organism, it is so distorted and imperfect that little can be made of it; its peculiar interest arises from its being associated with the earliest forms of life observed on the globe.

PALEOSAURUS, *pā-lē-ō-saw′rŭs* [Gr. *palaios*, ancient; *sauros*, lizard]: genus of fossil reptiles peculiar to the Permian period. The remains of two species occur in the dolomitic conglomerate at Redland, near Bristol, England. The teeth were more or less compressed, and

were furnished with serrated cutting margins. The vertebræ were biconcave, and had a remarkable depression in the centre of each vertebra, into which the spinal canal was sunk. The leg-bones show that the Paleosaurs were fitted for moving on the land. Owen thus exhibits their affinities: 'In their thecodont type of dentition, biconcave vertebræ, double-jointed ribs, and proportionate size of the bones of the extremities, they are allied to the Teleosaurus; but with these they combine a Dinosaurian femur, a lacertian form of tooth, and a crocodilian structure of pectoral and probably pelvic arch.'

PALEOTECHNIC, *pā′lē-ō-tĕk′nĭk* [Gr. *palaios*, ancient; *technē*, art]. pertaining to, or in the manner of, primitive art.

PALEOTHERIUM, *pā′lē-ō-thē′rĭ-ŭm* [Gr. *palaios*, ancient; *therion*, beast]: type-genus of a family of perissodactyle ungulates, from the European Tertiary; it was founded on remains discovered by Cuvier in the gypsum beds of Montmartre, at Paris. Cuvier's restoration of the *Palæo′theridæ* made them tapiroid, or resembling the modern tapir; but later discoveries, both in the old world and in the new, of additional species and allied genera, go to show that Cuvier's *A. magnum* resembled in form rather the llama, having the neck and legs elongated, though by its fundamental characters it is related to the horses and rhinoceroses. The skull resembled somewhat that of the rhinoceros, and the snout undoubtedly was blunt, quite without a proboscis. Between *Palæotheridæ* and *Equidæ* (Horses) there is an unbroken series of gradation of forms. *Paleotherium* and the allied genera, *Monacrum*, *Paloplotherium*, and *Propaleotherium*, ranged in size from the dimensions of a sheep to those of a horse.

PALEOTHEROID, *pā′lē-ō-the′royd:* an animal resembling, or allied to, the paleotherium.

PALEOTROPICAL, *pā′lē-ō-trŏp′ĭk-al* [Gr. *palaios*, ancient; and Eng. *tropical*]: of or pertaining to tropical or sub-tropical parts of the old or Eastern continent. India is assigned to the middle P. region, Australia to the eastern, Ethiopia to the western.

PALEOTYPE, n. *pā′lē-ō-tīp* [Gr. *palaios*, ancient; *tupos*, a type]: the systematic notation of all spoken sounds by means of the ordinary printing-types. This phonetic system, invented by Alexander J. Ellis, avoids introducing any new types, and instead avails itself of all the forms in present use (Roman, italic, small capital, etc.): these it turns or variously disposes so that one letter may do duty for more than one sound.

PALEOUS, *pā′lē-ŭs* [It. *paglioso*, from L. *palea*, chaff]· chaff.

PALEOVOLCANIC, *pā′lē-ō-vŏl-kăn′ĭk* [Gr. *palaios*, ancient; and Eng. *volcanic*]: volcanic, of a period earlier than the tertiary: P. rocks are frequently designated as *eruptive* rocks.

PALEOZOIC.

PALEOZOIC, *pā'lē-ō-zō'ĭk* [Gr. *palaios*, ancient; *zōē*, life]: the lowest division of fossiliferous rocks, and the third great division of geological time. It is preceded by the Azoic and Proterozoic eras, and succeeded by the Mesozoic. The name has reference to the character of the plant and animal life of the time. As a time division, the Paleozoic is generally called an Era, this term meeting with the recommendation of the International Geological Congress at its Bologna convention in 1881. Though in its modern sense primarily used for a time division, the term Paleozoic is also applied to that division of the earth's crust which was formed during that time. And indeed this is the original use of the term, when it was coined for the reception of the fossiliferous rocks below the so-called Secondary or Mesozoic division. The rocks thus named were formerly included with the crystalline rocks of all ages as 'Primary,' but later on they were separated at least in part, as 'Transition rocks.' Lyell, to avoid confusion, spoke of them as the 'Primary fossiliferous rocks.' The following parallel columns express perhaps as nearly as possible the correlation between the older and newer terms.

Older	Newer
Quaternary	Cenozoic
Tertiary	Mesozoic
Secondary	Paleozoic
Transition (or Primary fossiliferous)	Eozoic (or Proterozoic)
Primary	Azoic

The following subdivisions of the Paleozoic are recognized:

Permic (or Permian) era and system

Carbonic (Carboniferous or Carbonian) era and system.

Devonic (Devonian) era and system.

Siluric (Silurian, Upper Silurian) era and system.

Ordovicic (Ordovician, Lower Silurian or Champlainic) era and system.

Cambric (Cambrian) era and system.

The Paleozoic rocks underlie a large part of the most densely inhabited and richest agricultural portion of the U. S. In general, it is that portion of the country extending eastward from a line crossing western Minnesota, eastern Nebraska and Central Kansas, and Oklahoma to the older crystalline rocks of New York, New England and the eastern Appalachians, southward to the Gulf Plain in northern Georgia and Alabama, western Tennessee and Kentucky, and southwesterly across Arkansas to northern Texas.

The characteristics of Paleozoic life were very marked and stamp the eon as boldly contrasted with the succeeding Mesozoic. The Hydrozoa were represented by the group of Graptolites, and by *Dictyonema*, both of which are wholly confined to the Paleozoic. Among corals the group of rugose corals, or Tetracorolla (so-

called from having four primary radiating lamellæ or septa with reference to which the others are arranged), the honey-comb corals, *Favosites*, and the tube corals, *Aulopora*, *Syringopora*, *Halysites*, etc., are characteristic types practically unknown in post-Paleozoic time.

Brachiopods are perhaps the most important Paleozoic types, no less than 2,600 species having been described from the Ordovicic and Siluric deposits alone. The tetrabranchiate cephalopods were well represented during the Paleozoic by the Nautiloidea. Of forty families belonging to this class, only three originated in post-Paleozoic time, and only one of these, the family of the true Nautilus, continued to the present time. Among crustacea, the Trilobites are wholly confined to the Paleozoic rocks, of which they constitute in many respects the most characteristic type of fossil. Their greatest development was during Cambric and Ordovicic time. The remarkable order of Eurypterid crustaceans is also confined to the Paleozoic, constituting the most characteristic type of certain formations. The only other type of crustaceans abundantly represented in the Paleozoic rocks is that of the small bivalve ostracods.

During the Paleozoic era important physiographic changes took place in North America which may be summarized as follows: In early Cambric time the greater part of the interior of North America was out of water, the eastern shore being probably a short distance east of the present Appalachians, and the western shore on the western flanks of the rocky mountains. The southern shore was not far north of the present southern boundary of the United States. A narrow gulf extended northward along the western flank of the Appalachian protaxis, and probably connected with a similar gulf extending southward from the present Saint Lawrence gulf. The fauna of this Appalachian trough was mostly distinct from that of the Atlantic border. In the succeeding periods there was a continuous subsidence of the land, and a transgression of the shore-line, which closed in upon it, especially from the southwest. As the sea in each succeeding epoch reached farther up onto the land than it did before, the deposits of later date lapped over the earlier ones. This encroachment continued with many interruptions through the early part of Ordovicic time, when the great Appalachian Valley, bounded by two parallel folds, came into existence. This separated the interior or Mississippian sea from the Atlantic, until, with the final emergence of the land, this sea was transferred to the Great Plains region of the west.

Coincident with the formation of these folds, the interior sea retreated southwestward, only to readvance again during middle Ordovicic time. At the close of Ordovicic time, the Taconic revolution caused the formation of an effectual eastern barrier, and at the same time the waters of the interior sea were largely withdrawn. A gradual resubmergence in Siluric times, reestablished the Mississippian sea. At the close of the

Silurie the Mississippian sea was reduced to a narrow channel along its former eastern border. Toward mid-Devonie time this sea spread westward again to Michigan and southward to Indiana. In mid-Carbonie time, the interior sea extended to the foot of the Rocky Mountains. This condition was terminated by the great physiographie changes which accompanied the formation of the Appalachian Mountains. Later in Cretacie time, the Great Plains region and the Atlantie border were resubmerged, but eastern North America remained continuously above water.

PALEOZOOLOGY, n. *pā'lē-ō-zō-ŏl'ŏ-jĭ* [Gr. *palaios*, ancient; *zōŏn*, an animal; *logos*, discourse]: that branch of paleontology which treats of fossil animal remains.

PALERMO, *pa-lĕr'mō*, It. *pâ-lĕr'mō:* archiepiscopal city, important seaport, and cap. of the island of Sicily; cap. also of the province of Palermo, and with Naples, Rome, Milan, and Turin, one of the five most populous cities in the kingdom of Italy. Pop. (1901) 308,694. It is on the north coast of the island of Sicily, 135 m. by water west of Messina; lat. 38° 6′ n., long. 13° 20′ e.; in a highly cultivated and fertile plain called *La Conca d'Oro* (the Golden Shell), commanding a beautiful view of the Gulf of Palermo, on which it stands, and backed toward the interior by ridges of mountains. In shape the town is an oblong parallelogram, the direction of its length being from s.w. to n.e. It is divided into four quadrangular parts by two great streets, the beautiful *Via Vittorio Emanuele*, formerly the *Via Toledo* or *Cassaro*, and the *Strada Nuova* or *Macgueda*, which cross each other at right angles in the middle of the city. It is more than four m. in circumference, is surrounded by walls pierced with 12 gates and flanked with bastions, and is defended by several batteries. The houses are balconied, flat roofed, and have glass doors, instead of windows. The streets, besides the two main thoroughfares above mentioned, are generally well laid out, and there are several fine promenades, of which the most magnificent is the famous Marina, along the shore, on the line of the ancient fortifications and bordered by the palaces of the nobles. Palermo contains 60 parish churches; 8 abbeys; 71 monasteries and convents, to which belong 20,000 to 30,000 monks and nuns; also there are 19 oratories. Among the churches is the cathedral—the church of St. Rosalie. At intersection of the two principal streets is a large octagonal space or *Piazza*, lined with palaces, and adorned with statues and marble fountains. The royal palace is a huge pile, with a splendid chapel, built 1129, and contains many pillars of rare workmanship and rich mosaics with Arabic inscriptions. The cathedral, a fine edifice, originally Gothic, but with incongruous Greek additions, is adorned with marble columns and statues, and contains monuments of Emperor Frederick II. and of King Roger, founder of the Norman monarchy in Sicily. Among principal public institutions of Palermo are the univ., attended by 1,200 students, an acad. of arts and sciences, a medical acad.,

an institution for arts and antiquities, a beautiful and extensive public garden, public libraries, theatres, etc. P. is an archbishop's see, residence of the gov. of the island, and seat of the supreme courts. There are manufactures of silks, cottons, oil-cloth, leather, gloves, etc. The harbor is formed by a mole, 1,300 ft. in length, on which there are a light-house and battery. Vessels, with total tonnage 700,000, enter and clear the port annually; imports amount in value to nearly $5,000,000; exports to about the same.

The environs are interesting as well as picturesque, and embrace many pleasant villas and noble mansions. N.W. of the city is Monte Pellegrino, the Eircte of the ancients, an abrupt rocky mass, in which there is a grotto or cave, in which Santa Rosalia, a young Norman princess, lived a life of religious retirement. In P., Santa Rosalia is esteemed more highly than even Santa Maria; the festival in her honor, July 9–13, is the most important on the island. During its celebration, the city is illuminated, the streets are gay and brilliant, and there is immense influx of strangers from the vicinity. But the chief feature of the festival is the procession to the cave. An immense silver image of the saint is borne thither on a wagon, 70 ft. long, 30 ft. broad, and 80 ft. high. Its form resembles that of a Roman galley, with seats for a choir. The wagon is drawn by 56 mules, covered with the gayest trappings, and driven by 28 postilions.

P., anc. *Panormus*, was probably a Phœnician colony, but had become a dependency of Carthage before the name occurs in history. With the exception of a short time about B.C. 276, when it fell into the hands of the Greeks, it was the headquarters of the Carthaginian power in Sicily, until taken by the Romans during the First Punic War, B.C. 254, when it became one of the principal naval stations of the Romans. The name Panormus is from the excellent anchorage (Gr. *hormos*) in the bay; but the Phœnician name found on coins is *Machanath*, meaning 'a camp.' The Vandals, and afterward the Arabs, made it the cap. of the island; and after the Norman Conquest it was the seat of the king of Sicily. It remained the royal residence under the Aragonese kings; but the court was removed after Sicily became united to the then kingdom of Naples: see SICILY.

PALES, *pā'lēz:* deity of the ancient Romans, somewhat resembling the Greek god Pan, and supposed to preside over flocks and shepherds. It is represented by some writers as male and by others as female. An annual festival called Palilia was held in its honor at Rome Apr. 21, this being the accepted date of the founding of the city. At this festival the participants rushed through burning straw, the stables were purified by fire and smoke, offerings of various products were made, forgiveness for neglect of service in the past was sought, petitions were offered for the safety and increase of the flocks, and the ceremonies were concluded with a feast.

PALESTINE, *păl'ės-tīn* (*Palæstina Philistia*), or THE HOLY LAND: country of s.w. Asia, comprising the s. portion of Syria, and bounded w. by the Mediterranean, e. by the valley of the Jordan, n. by the mountain ranges of the Lebanon and the glen of the Litâny (Leontes), and s. by the Desert of Sinai; lat. 31° 15′–33° 20′ n., long. 34° 30′–35° 30′ e.; present pop. prob. not exceeding 700,000. Within these narrow limits, not more than 145 m. in length by 45 in average breadth—an area less than that of the state of Vt.—is comprised the 'Land of Israel' or 'Canaan,' arena of the greatest events in the history of man. The principal physical features of P. are: (1) a central plateau or table-land, with a mean height of 1,600 ft., covered with an agglomeration of hills, which extend from the foot of the Lebanon to the s. extremity of the country; (2) the Jordan valley and its lakes; (3) the maritime plain, and the plains of Esdraëlon and Jericho. On the e., the descent from the central plateau is steep and rugged, from Lake Huleh to the Dead Sea. On the w., it is more gentle, but still well marked, toward the plains of Philistia and Sharon. The ascertained altitudes on this plateau, proceeding from s. to n., are Hebron, 3,029 ft.; Jerusalem, 2,610; Mount of Olives, 2,724; Mount Gerizim, 2,849; Mount Tabor, 1,843; Safed, 2,775 ft. above sea-level. Nearly on the parallel of the Sea of Galilee, the range of Carmel extends from the central plateau n.w. to the Mediterranean, where it terminates abruptly in a promontory surmounted by a convent. It rises from 600 ft. in the w. to 1,810 ft. in the e., and is composed of a soft white limestone, with many caverns. Beyond the boundary of P. on the n., but visible from the greater part of the country, Mt. Hermon rises to 9,381 ft., and is always snow-clad. From the formation of the central plateau, the drainage is nearly always e. and w., to the Jordan and the Mediterranean. The streams of the plateau are insignificant, and generally dry in summer.

The geological formation of the country consists of Jurassic and cretaceous limestone, in many places covered with chalk, and rich in flints, with occasional interruptions of tertiary, basaltic, and trappean deposits. The upper strata consist of limestone of white or pale brown color, containing few fossils, but abounding in caverns, which form one of the peculiarities of the country. The general features of the landscape exhibit soft rounded hills, separated by narrow glens or valleys of denudation; the strata are occasionally level, but more frequently violently contorted, as on the route from Jerusalem to Jericho, where many fissures are 1,000 ft. deep, and only 30 or 40 ft. wide. Ironstone occurs in small quantities; rock-salt, asphaltum, and sulphur abound near the Dead Sea, where, as also near the Sea of Galilee, are many hot springs. Volcanic agency is evident in the obtruded lava of former ages, and in frequent earthquakes of modern times. The vast crevasse through which the Jordan flows, and which cleaves the

land from n. to s., is one of the most remarkable fissures on the globe; it is 5 to 12 m. wide, and of the extraordinary depth of 2,630 ft. at the bottom of the Dead Sea. Through this the river Jordan descends at the rate of 11 ft. in a mile, with a course so tortuous that it travels 132 m. in a direct distance of 64, between the Sea of Galilee and the Dead Sea. It is the only perennial river of P., except the Kishon, which is permanent only in its lower course, and the Litâny, on its n. border: see JORDAN. The only lakes of P. are in the valley of the Jordan. See GENNESARET, SEA OF: DEAD SEA.

The plain of Philistia extends from the coast to the first rising ground of Judah, about 15 m. in average width; the soil is a rich brown loam, almost without a stone. It is in many parts perfectly level; in others undulating, with mounds or hillocks. The towns of Gaza and Ashdod, near the sea, are surrounded by groves of olives, sycamores, and palms. This plain is still, as it always was, a vast grain-field, an ocean of wheat, without a break or fence; its marvellous fertility has produced the same succession of crops, year after year, for 40 centuries, without artificial aid. The plain of Sharon is about 10 m. wide in the s., narrowing toward the n., till it is terminated by the buttress of Carmel. Its undulating surface is crossed by several streams; the soil is rich, and capable of producing enormous crops; but only a small portion of it, near Jaffa, is cultivated, and it is rapidly being encroached on by the sea-sand, which, between Jaffa and Cæsarea, extends to a width of 3 m. and a height of 300 ft. The famous ancient cities of this region, Cæsarea, Diospolis, and Antipatris, have vanished. Jaffa (Joppa) alone remains, supported by travellers and pilgrims from the west, on the way to Jerusalem. The great plain of Esdraëlon, or Jezreel, extends across the centre of the country from the Mediterranean to the Jordan, separating the mountain ranges of Carmel and Samaria from those of Galilee. Its surface is drained by the Kishon, which flows w. to the Mediterranean at Haifa. The plain is surrounded by the hills of Gilboa and Little Hermon; the isolated Mount Tabor rises on its n.e. side. It is extremely fertile in grain where cultivated, and covered with gigantic thistles where neglected. It is richest in the central part, which slopes e. to the Jordan—the battle-field where Gideon triumphed, and Saul and Jonathan were overthrown. It is the home of wandering Bedouins, who camp in its fields, and gallop over its greensward in search of plunder. Many places of deep historical interest are connected with this plain. Shunem, Nain, Endor, Jezreel, Gilboa, Bethshan, Nazareth, and Tabor are in its vicinity. The plain of Jericho is a vast level expanse, covered with the richest soil, now quite neglected. Around the site of Jericho, 'the city of palm-trees,' there is not now a single palm; but a recent experiment proved its capability of producing in abundance all the crops for which it was formerly famous. The climate of P. is very

varied; Jan. is the coldest and July the hottest month. The mean annual temperature of the year at Jerusalem is 65° Fahr., resembling that of Madeira, the Bermudas, and California. The extreme heat of the summer months is modified by sea-breezes from the n.w. In the plain of Jericho and the Jordan valley it is extremely hot and debilitating. The *sirocco*, a s.e. wind, is often oppressive in early summer. Snow falls in the uplands in Jan. and Feb., and thin ice at that period is frequent at Jerusalem, where the annual rainfall is 61 inches. Heavy dews fall in summer, and the nights are cold. Violent thunder-storms occur in winter. In the s., Judah and part of Benjamin, is a dry, parched land; the bare limestone rock is covered here and there with a scanty soil, and the vast remains of terraces show how assiduously it must have been cultivated in ancient times to support the teeming population indicated by the ruins of cities with which every eminence is crowned. To the n. of Judea the country is more open, the plains are wider, the soil richer, and the produce more varied, till at Nabulus the running streams and exuberant vegetation recall to the traveller the scenery of the Tyrol.

The botany of P. is rich and varied, resembling that of Asia Minor. Among its trees are the pine, oak, elder, and hawthorn in the n. and higher districts, and the olive, fig, carob, and sycamore elsewhere. The cultivated fruits are the vine, apple, pear, apricot, quince, plum, orange, lime, banana, almond, and prickly pear. Wheat, barley, peas, potatoes, and European vegetables, cotton, millet, rice, maize, and sugar-cane are among its products. The date now ripens its fruit only in the south and on the seaboard. The brilliant flowers which in spring enamel the surface, and tinge the entire landscape, comprise the adonis, ranunculus, mallow, poppy, pink, anemone, and geranium. In the Jordan valley, 900 or 1,000 ft. *below* the sea-level, the vegetation is tropical, resembling that of Arabia; the nubk (*Spina Christi*), the oleander and the small yellow 'apples of Sodom' are conspicuous. The most valuable products of the vegetable kingdom are from the vine, fig, olive, and mulberry trees. Wine for home use is made in all the central and s. districts; the best is made at Hebron from the grapes of Eschol. Olive-oil is a valuable export.

The wild animals of P. comprise the Syrian bear in Lebanon, the panther, jackal, fox, hyena, wolf, wild boar, gazelle, and fallow-deer: the lion is now unknown. The domestic animals are the Arabian camel, ass, mule, horse, buffalo, ox, and broad-tailed sheep. Among birds are the eagle, vulture, kite, owl, nightingale, jay, and kingfisher—the latter of brilliant plumage—the cuckoo, heron, stork, crow, partridge, and sparrow. Fish swarm in the Sea of Galilee, and bats and lizards abound.

P. is at present divided into three administrative districts: (1) the vilayet of Beirut, extending about as far south as Jaffa, and including the districts of

Nabulus and Acre; (2) the district of Jerusalem, directly under Turkish sway; (3) the vilayet of Damascus, including the entire East Jordan country and the district of the Hauran. Its population is not more than 700,000, mainly of a race of mixed descent sprung from Syrians, Arabs, and Greeks, who speak Arabic and are mostly Moslems; also Greek Christians of Syrian descent, Turks, Maronites, Rom. Catholics, Armenians, Jews—the latter from various lands and mainly in Jerusalem, Hebron, Tiberias and Safed. There are a number of Jewish agricultural colonies with schools at Jaffa, and one important German colony near Carmel and Jaffa.

The outlook for progress in P. is hopeful, with the opening of the Jaffa–Jerusalem R. R. In 1905 the exports and imports reached $4,047,000, an increase of $308,000 over 1904. The chief exports were barley, wheat, oranges, watermelons, grapes, wines; the imports amounted to $2,258,000 and consisted largely of hardware, cotton goods, sugar, building materials, flour, coal, etc. Cotton imports, almost wholly from Manchester, were valued at $876,000. Jaffa, the chief port of P., is making rapid strides forward, with 4 banks doing flourishing business, and the revenue at custom-house estimated at $200,000, four times the amount of 20 years ago. See SYRIA: *Jews*: HITTITES. Consult: Conder, *Survey of Eastern Palestine* (1900); Clermont-Ganneau, *Archæological Researches* (1896); Hull, *The Geology of Palestine and Arabia Petræa* (1886); Tristram, *The Fauna and Flora of Palestine* (1884).

PALESTINE: city, cap. of Anderson co., Tex.; on the International and Great Northern R.R., and the n.e. terminus of a branch r.r. that extends 180 m. to Austin. It has a cotton-seed oil mill, a manufactory of brass and iron, grist and saw mills, etc. The prominent buildings are the railroad offices and shops, the Y. M. C. A. building, the churches and schools. A point of interest is Fort Houston. The government is vested in a mayor who holds office two years, and in a council composed of the mayor and aldermen. Pop. 9,000.

PALESTRINA, *pâ-lĕs-trē'nâ:* Italian city, 22 m. e.s.e. of Rome, on the slope of an offset of the Apennines. Pop. 6,000. Besides several interesting churches, the town contains a castle, once the chief stronghold of the Colonna, to whom the town belonged; and the palace and garden of the Barberini family. The view across the Campagna and toward the Alban Hills is magnificent. There is manufacture of coarse woolen goods.

P. is built almost entirely upon the site and the gigantic substructions of the Temple of Fortune, one of the great edifices of the former city of Prænestе. This city was one of the most ancient as well as powerful cities of Latium. It covered the hill (2,400 ft. above sea-level) on the slope of which the modern town stands, and was overlooked by a citadel of great strength. The site of this citadel on the summit of the hill is now occupied by a castle of the middle ages, *Castel S. Pietro;* but re-

mains of the ancient walls are still visible. We hear of Prænestе first as a member of the Latin League; but B.C. 499 it quitted the confederacy, and joined the cause of the Romans. B.C. 380 the Prænestines, having rejoined their ancient allies, opened a war with Rome; but were completely routed on the banks of the Allia by T. Quintius Cincinnatus, and beaten back to their own gates. They were prominent in the famous Latin War, B.C. 340. Having given shelter to the younger Marius, B.C. 82, this city was besieged by the forces of Sulla, was taken, and all the inhabitants were put to the sword. A military colony was then established in their place, and soon the city began to flourish anew. Its elevated and healthful situation, at no great distance from the capital, made it a favorite summer resort of the Romans. Augustus frequented it; Horace often found this city a pleasant retreat; and here Hadrian built an extensive villa. The Temple of Fortune is described by Cicero as an edifice of great antiquity and splendor, and its oracle was much consulted. The town became the stronghold of the family of Colonna in the middle ages; but was given to the Barberini family by Urban VIII.

PALESTRI'NA, Giovanni Pierluigi da: distinguished musical composer: prob. 1524–1594, Feb. 2; b. at Palestrina (q.v.), whence his surname. At the age of 16, he went to Rome, and studied music under Claude Goudimel, afterward one of the victims of the St. Bartholomew massacre. In 1551 he was made *maestro di capella* of the Julian Chapel, and 1554 he published a collection of Masses, so highly approved by Pope Julius III., to whom they were dedicated, that he appointed their author one of the singers of the pontifical chapel. Being a married man, he lost that office on the accession to the pontificate of Paul IV., in whose eyes celibacy was a necessary qualification for its duties. In 1555 he was made choir-master of St. Maria Maggiore, and held that position till 1571, when he was restored to his office at St. Peter's. In 1563, the Council of Trent having undertaken to reform the music of the church, and condemned the secular words and music introduced into Masses, some compositions of P. were pointed to as models, and their author was intrusted with the task of remodelling this part of religious worship. He composed three Masses on the reformed plan, one of them, known as the Mass of Pope Marcellus (to whose memory it is dedicated), may be considered to have saved music to the church by establishing a type far beyond anything that had preceded it, and, amid all the changes which music has since gone through, stands as the model of Roman ecclesiastical music. It was sung in the Sistine Chapel, first, 1565, June 19; and was produced in England for the first time 1882, when its music was pronounced 'the most beautiful, the most solemn, and the most truly devotional that has ever been dedicated to the service of the church.' During the remaining years of his life, the number and the quality of the works of

P. are equally remarkable. His published works consist of 13 books of Masses, 6 books of Motets, 1 book of Lamentations, 1 of Hymns, 1 of Offertories, 1 of Magnificats, 1 of Litanies, 1 of Spiritual Madrigals, and 3 books of Madrigals. P. is considered the first musician who reconciled musical science with musical art, and his works form a most important epoch in the history of music. Equally estimable in private life, and gifted as a musician, P. struggled through a life of poverty during eight pontificates; his appointments were meagre, and his publications unremunerative. A memoir of his life and writings has been written by Abbé Baïni.

PALESTRO, *pâ-lĕs'tro:* village of Piedmont, 8 m. s.e. of Vercelli, famous as the scene of a battle between the Sardinians and Austrians 1859, May. The Piedmontese drove the Austrians from this village May 30, and on the 31st defended it with great bravery against an Austrian attack. The Piedmontese in this battle were assisted by 3,000 French Zouaves, and the Austrans lost 2,100 men killed and wounded, 950 prisoners, and 6 pieces of cannon. June 1 the allies entered Novara.

PALETIOLOGY, n. *pā-lē'shĭ-ŏl'ŏ-jĭ* [Gr. *palaios*, ancient; *aitĭă*, cause; *logos*, discourse, reason]: the science which explains, by the law of causation, the past condition and the changes of the earth. PALE'TIOLOG'ICAL, a. *-ō-lŏj'ĭ-kăl*, connected with or relating to paletiology. PALE'TIOL'OGIST, n. *-ŏl'ŏ-jĭst*, one versed in.

PALETOT, n. *păl'ĕ-tō* [F. *paletot;* OF. *palletoc*, a short coat with sleeves: Bret. *paltok*, a coarse cloak worn by peasants at their work—from *pall*, a covering, and *tok*, a cap: comp. Gael. *peall*, a skin or hide; *pealltag*, a sheepskin jacket]: a light loose overcoat. *Note.*—Skeat derives this word from O. Dut. *pals*, later written *palts*, answering to Ger. *pfalz:* comp. *palsgrave*, a count palatine. Hence *pals* = Eng. *palace*, and the sense is palace-coat, i.e., court-dress. The word, however, may be connected with L. *palla*, *pallium*.

PALETTE, n. *păl'ĕt* [F. *palette*, a palette, a surgeon's slice—from *pale*, the blade of an oar; *pelle*, a shovel: It. *paletta*, a little shovel—from *pala*, any kind of flat and broad thing, a spade—from L. *pāla*, a spade]: the small oval flat of wood or other material on which a painter lays his colors while painting, having a thumb-hole at one end for holding it; spelled also PALET (see PAINTING). TO SET THE PALETTE, to lay upon it the pigments in a certain order, selecting them according to the key in which the picture is to be painted. PALETTE-KNIFE, a thin, flat knife rounded at the end, used to mix colors on the grinding-slab, and to assist their incorporation by the muller.

PALEY, *pā′lĭ*, WILLIAM, D.D.: English divine: 1743–1805, May 25; b. Peterborough. His father was a Yorkshireman, and not long after P. was born returned to his native parish of Giggleswick, one of the wildest and most sequestered districts in the West Riding, to become master of the grammar school there. Young P. was brought up among the shrewd, hard-headed peasantry of Yorkshire; and it is probable that he either naturally possessed or insensibly acquired their moral and mental characteristics. At all events, he soon became conspicuous in the family for his good sense; and when he left to enter Christ's College, Cambridge, as a sizar, in his 16th year, his father said: 'He has by far the clearest head I ever met with.' At Cambridge, P. led for the first two years a gay, idle, and dissipated life, but thereafter became a severe student, and took his bachelor degree 1763 with highest honors. He then taught for three years in an acad. at Greenwich. In 1765 he obtained the first prize for a prose Latin dissertation—the subject being 'A Comparison between the Stoic and Epicurean Philosophy, with respect to the Influence of each on the Morals of a People,' in which he characteristically argued in favor of the latter. Next year he was elected a fellow and tutor of Christ's, and took the degree M.A. In 1767 he was ordained a priest. His career of 10 years as a college tutor was eminently successful; and during this period he appears to have systematized his principles in moral and political philosophy. In 1776 P. married, and was of course obliged to give up his fellowship, but was compensated by a presentation to the livings of Mosgrove and Appleby in Westmoreland and of Dalston in Cumberland. Four years later he was collated to a prebendal stall in the cathedral church of Carlisle, 1782 he became archdeacon, and 1785 chancellor of the diocese. In 1785 he published his *Elements of Moral and Political Philosophy*. In this work he propounds his ethical theory, commonly called utilitarianism, but really a theological adaptation of the utilitarian philosophy. He begins by renouncing the favorite doctrine of the Moral Sense, against which he adduces a series of strong objections. He then takes up the question of the source of obligation, and resolves it into the will of God, enforced by future reward and punishment, admitting candidly that virtue is prudence directed to the next world. The will of God, so far as it is not rendered explicit by revelation, is to be interpreted by the tendency of actions to promote human happiness; the benevolence of the Deity being supposed. Objection has frequently been taken to the principles on which P. rests his system, but the lucidity and appositeness of his illustrations are conceded. His treatise is now commonly judged to have failed in sounding the depth of 'moral obligation,' but it at least brushed off into oblivion the shallow and muddy mysticism that had long enveloped the philosophy of politics. P.'s plain sarcastic view of the 'divine right of kings,' which

he puts on a level with the 'divine right of constables,' gave extreme offense to George III., but is now held by everybody to be beyond question. In 1790 appeared his most original and valuable work—*Horæ Paulinæ, or the Truth of the Scripture History of St. Paul evinced by a Comparison of the Epistles which bear his Name with the Acts of the Apostles, and with one another.* The aim of this admirable work is to prove, by a great variety of 'undesigned coincidences,' the improbability, if not impossibility, of the usual infidel hypothesis of his time—viz., that the New Testament is a 'cunningly devised fable.' It was dedicated to his friend John Law, then bp. of Killala in Ireland, to whose favor he had been indebted for most of his preferments. P.'s next important work, less original than the preceding, but very dexterous and effective, was *A View of the Evidences of Christianity*, pub. 1794. Later and keener criticism is not satisfied with P.'s 'Evidences;' but in P.'s own day he was held to have achieved a splendid triumph over skeptics. The bp. of London appointed him a prebend of St. Pancras; shortly afterward he was promoted to the sub-deanery of Lincoln (£700 per annum); Cambridge conferred on him the degree D.D.; and the bp. of Durham the rich rectory of Bishop Wearmouth (£1,200 per annum), in consequence of which he honorably resigned his livings in the diocese of Carlisle. After 1800 he became subject to a painful disease of the kidneys; yet he continued to write, and in 1802 published perhaps the most widely popular of all his works—*Natural Theology, or Evidences of the Existence and Attributes of the Deity;* which, however, is based, and to a large extent borrowed, from the *Religious Philosopher*, the work of a Dutch philosopher named Nieuwentyt, an English translation of which appeared 1718–9. The plagiarisms are palpable, but have been accounted for on the supposition that the *Natural Theology* was 'made up' from his loose papers and notes written when P. was a college tutor, and that he had forgotton the sources from which he derived them. He has, however, taken nothing which he has not greatly improved. A noted ed. of this work, expanded by annotations and dissertations, is that by Lord Brougham and Sir Charles Bell (1836–39). P. had a family of four sons and three daughters. A complete ed. of his works was pub. 1838 by one of his sons, the Rev. Edmund P. The best biography is by Meadley (1809).

PALFREY, n. *pawl'frĭ* [prov. F. *palefrei;* F. *palefroi*—from It. *palefreno*—from mid. L. *parafrēdus*, an easy-going horse for riding: mid. L. *veredus*, a post-horse: perhaps connected with Ger. *pferd*, a horse]: an ordinary riding-horse, as distinguished from a war-horse; a small or gentle horse fit for a lady's use. PALFREYED, a. *pawl'frĭd*, riding on or supplied with a palfrey.

PALFREY, *pawl'frē* or *-frĭ*, John Gorham, d.d., ll.d.: historian: 1796, May 2—1881, Apr. 26; b. Boston. He studied at Phillips Academy, Exeter; graduated from Harvard 1815; and became pastor of the Brattle Square (Unitarian) Church in Boston 1818, succeeding Edward Everett. He resigned 1830, and the following year became prof. of sacred literature in Harvard College. He was a member of the state legislature 1842; sec. of state 1844–47; member of congress 1847–49, being elected as a whig; was unsuccessful as a candidate of the free-soil party for re-election; and was defeated for gov. 1851.—He was one of the founders of the republican party, was postmaster of Boston 1861–67, and in the latter year was a member of the Anti-Slavery Congress at Paris. During his public life he had been a close student and had become widely known as an able writer. He edited the *North American Review* 1835–43; furnished for the *Boston Whig* a series of able articles on *The Progress of the Slave Power;* and was, for a time, on the editorial staff of the *Commonwealth.* He was also a lecturer at the Lowell Institute, Boston, 1839 and 42. Besides numerous smaller works, he published: *Academical Lectures on the Jewish Scriptures and Antiquities*, 4 vols. (1833–52); *The Relation between Judaism and Christianity* (1854); and a *History of New England*, 3 vols. (1858–64). An abridgment of the latter work appeared in 2 vols. (1866), and 2 additional vols. were issued (1872–3). At the time of his death, which occurred at Cambridge, he was bringing the work down to a later date than it had previously reached.

PALGRAVE, *pawl'grāv*, Sir Francis: antiquary and historian: 1788, July—1861, July 6; b. London; of Jewish parentage, son of Meyer Cohen, member of the stock exchange. He was educated at home under a Dr. Montucci, and early showed extraordinary genius. When only eight years old, he made a translation into French of the *Battle of the Frogs and Mice*, from the Latin version of Beauclerc, which was printed by his father 1797. In 1803 he was articled as a clerk to a legal firm, and continued with the same firm as managing clerk until 1822, when he took employment under the Record Commission. He had previously made himself known as a literary antiquarian, by the publication 1818 of some Anglo-Norman chansons, which he edited with much care. On the occasion of his marriage, 1823, he changed his name to P., the maiden name of his wife's mother. He was called to the bar 1827, and had considerable practice for some years in pedigree cases before the house of lords. In 1831 he published a *History of England*, a part of the *Family Library;* 1832 appeared his *Rise and Progress of the English Commonwealth;* also *Observations on the Principles, etc., of New Municipal Corporations.* In that year he received the honor of knighthood, and was subsequently one of the municipal corporation commissioners. He was one of four dissentients from the commissioners' report, 1835,

and published his protest against it. On the reconstruction of the record service, 1838, Sir F. P. was appointed deputy-keeper of her majesty's records, and held that office during the rest of his life. He edited for the govt.: *Calendars of the Treasury of the Exchequer*, *Parliamentary Writs*, *Curia Regis Records*, and *Documents Illustrative of the History of Scotland*. In his private capacity, he produced *The Merchant and the Friar*, an imaginary history of Marco Polo and Friar Bacon; also *Handbook for Travellers in N. Italy*, and *History of England and Normandy* (4 vols. 1851–64). Sir F. P. wrote also numerous articles for the *Edinburgh* and *Quarterly Reviews*. His great merit as a historic writer was in manifesting the advantage of careful study of the original sources of information among British public records. He died at Hampstead.—His son, Francis Turner P. (b. 1824), has been engaged in educational work under the govt., and has published essays on art and poems.

PAL'GRAVE, William Gifford: Rom. Cath. missionary and explorer: b. Westminster, 1826, Jan. 24--1888 Sep. 30; son of Sir Francis P. He graduated with honors from Trinity College, Oxford, 1846; was an army officer at Bombay 1847–53, and while in India joined the Rom. Cath. Church. He afterward graduated from the Jesuit theol. seminary at Laval, France; received ordination as a priest, and for several years was in active missionary work in Syria. He was called to France 1860 by Emperor Napoleon III., to report on the disturbed condition of Syria, and the following year was commissioned by the emperor and encouraged by his religious superiors to explore the central and e. portions of Arabia. Disguised as a physician, he accomplished this dangerous feat 1862–3. He returned to Europe, retired from the order of Jesuits 1864, was sent to Egypt 1865 by the British govt., to secure the release of prisoners held in Abyssinia, and was appointed consul at Soukhoum-Kalé 1866, at Trebizond the following year, at St. Thomas 1873, Manila 1876, and consul-gen. to Bulgaria 1878. In 1880 he became consul-gen. to Siam. Among his published works are: a *Narrative of a Year's Journey through Central and Eastern Arabia*, 2 vols. (1865); *Essays on Eastern Questions* (1872); *Hermann Agha*, 2 vols. (1872); *Alkamah's Cave* (1875); and *Dutch Guiana* (1878). He is an honorary member of various foreign scientific bodies; a fellow of the Royal Geographical Soc. and of the Royal Asiatic Society.

PALI n. *pâ′lē* [corruption of Skr. *Prâkrit* (q.v.)]: sacred language of Buddhism, an Aryan tongue, extinct as a spoken language. Its origin must be sought for in one or several of the popular dialects of anc. India, comprised under the general name of Prâkrit, and related to Sanskrit as the Romance languages in their earlier period are to Latin. It was formerly assumed that P. arose from the special Prâkrit dialect Mâgadhî, or the language spoken in Magadha; but, according to the view expressed by Lassen in his *Indische Alterthumskunde*, this hypothesis is not tenable, since the peculiarities of this dialect are not compatible with those of the P. The same distinguished scholar holds that the Prâkrit dialects called the S′aurasenî and Mâhârâshṭ′rî have a closer relation to the P. than any other, and that the origin of the P. must therefore be traced to w. Hindustan, between the Jumna river and the Vindhya Mountains; though he observes, at the same time, that the P. is older than these dialects, which are therefore more remote than it from Sanskrit. Whether the oldest works of the Buddhist religion were written in P. is doubtful. It is more probable that the language in which the founder of the Buddhist religion conveyed his doctrine to the people was not yet that special language, but a mixture of classical and popular Sanskrit, such as it still appears in the Buddhistic Sûtras. Later, however, P. became the classical language in which the Buddhists wrote their sacred, metaphysical, and secular works. The most important historical work in this language is the *Mahâvans′a* (q.v.); other P. works which have lately become known in Europe are the *Dhammapada*, on the Buddhist doctrine, and five *Jâtakas*, containing a fairy-tale, a comical story, and three fables—edited and translated by V. Fausböll (Copen. 1855 and 61). P. ceased to be a living language of India when Buddhism was rooted out of it; it was carried by the fugitive Buddhists to other countries, especially Ceylon, Burmah, and Siam; but in these countries, too, it gave way before the native tongues, in which the later Buddhist literature was composed.

PALICHTHYOLOGY, n. *pā-lĭk′thĭ-ŏl′ŏ-jĭ* [Gr. *palaios*, ancient; *ichthus*, a fish; *logos*, discourse]: that branch of paleontology which treats of fossil fishes.

PALIFICATION, n. *păl′ĭ-fĭ-kā′shŭn* [L. *palus*, a stake or post; *făcĭō*, I make]: the act or process of rendering ground firm by driving posts or piles into it.

PALILOGY, n. *pă-lĭl′ŏ-jĭ* [Gr. *palin*, again; *logos*, a discourse]: in *rhet.*, the repetition of a word, or the fragment of a sentence, with the view of increased energy.

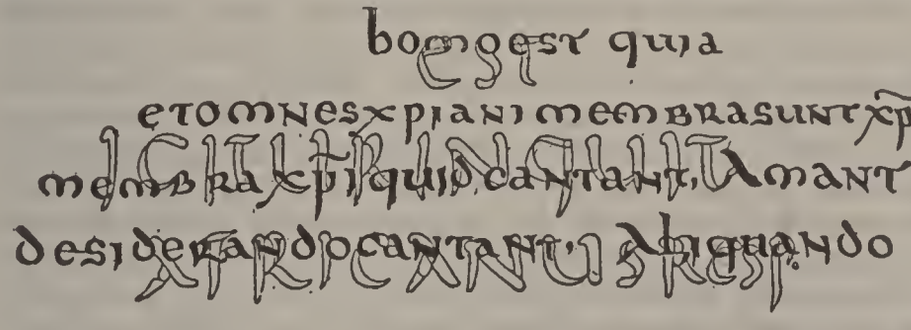
PALIMPSEST, n. *păl'ĭmp-sĕst* [Gr. *palimpsēs'tos;* L. *palimpsēs'tus*, parchment the writing of which has been effaced for other writing—from Gr. *palin*, again; *psāō*, I rub away or scrape]: a MS. parchment, or of papyrus, paper, or other material, which, after only a partial erasure, has been written over a second time, and on which the former writing is more or less discernible. When the MS. had been written with one of the species of ink employed by the ancients, merely a fatty pigment, chiefly of lamp-black, and only coloring the surface, but not producing a chemical change, there was little difficulty in obliterating the writing: it was accomplished by the use of a sponge, and, if necessary, of a scraper and polishing-tool; and, where proper pains were taken, the erasure of the first writing was complete. But when the ink was mineral, its effect reached beyond the surface. In that case a scraping-tool or pumice-stone was indispensable; if these were hastily or insufficiently applied, the erasure was imperfect; and thus it often happens in ancient MSS. that, from lack of proper care by the copyist in preparing the parchment for rewriting, the original writing may still be read without difficulty.

The practice of re-preparing used parchment for second use existed among the Romans: the material thus re-prepared was reserved for the meaner uses. We meet frequent allusions in the classical writers, as Plutarch, Cicero (*Ad Familiares*, vii. 18), Catullus (xxii. 115), and others, to the P., in the sense of a blotter or first-draft book, on which the rough outline or first copy of a document was written, preparatory to the accurate transcript for actual use; and it appears equally certain that in many cases whole books were written upon re-prepared parchment or papyrus, not only among the Greeks and Romans, but among the ancient Egyptians also.

Of palimpsests of the classic period, however, no specimen has ever been discovered. It is to the necessities of the mediæval period that literature owes the unquestionably important advantages which have arisen from the revival of the ancient practice of re-preparing already used material for writing. Under the early emperors, the intercourse with Egypt and the east secured a moderately cheap and abundant supply of Papyrus (q.v.), which rendered it unnecessary to recur to the expedient of the P.; and this became still more the case in the 5th and 6th c., when the tax on papyrus was abolished. But after the separation of east and west, and still more after the Mohammedan conquest of Egypt, the supply of papyrus almost completely ceased; and from the 7th c. in the west, and the 10th or 11th in the east, the P. is found in comparatively frequent use; and its frequency in the 15th c. may be estimated from the fact that some of the earliest books were printed on P. Some writers have ascribed the prevalence of its use to the indifference and even hostility of the monks and clergy to

classical literature, and have attributed to their reckless destruction of classic MSS., in order to provide material for their own service-books and legendaries, the deficiencies in the remains of ancient learning which scholars now deplore. Some part of the loss doubtless thus arose, though it is certain that we owe to the mediæval monks and clergy whatever of ancient literature has been preserved to our day. But the condition in which the existing palimpsests are uniformly found—mostly mere fragments of the ancient writers whose works they originally contained—shows that the MSS. broken up by the mediæval copyists for their own purposes were almost always already imperfect, or otherwise damaged; nor is there anything in the condition of any single P. which has reached our day to justify the belief that, when taken for rescription, the original work was in a state at all approaching completeness. Fortunately, however, there are many of the relics of ancient learning of which even the mutilated members have an independent value; and this is true especially of biblical MSS., particularly under the critical aspect; and, in a still broader sense, of all the remains of the ancient historians.

Since the chief, if not the sole, interest of palimpsest MSS. lies in the ancient writing which they had contained, their value to literature mainly depends on the degree of legibleness which the ancient writing still retains. It is difficult to make this fully intelligible to the reader without an actual inspection, but the facsimile annexed illustrates it. The passage selected for



the illustration is from page 62 of the Vatican MS., from which Mai deciphered the fragments of the *De Republica*. The darker letters are those of the modern MS.; the faint lines are those of the original codex. Although so much more faint than the modern writing, they can be read with facility on account of their greater size. We transcribe both texts in ordinary characters. The original was as follows:

EST

IGITUR INQUIT

AFRICANUS RESP.

(The ordinary contraction for *Respublica*.)

The corresponding lines of the modern MS., from St. Augustine's commentary on the Psalms, are:

homo est quia
et omnes Χρῖανι (Christiani) membra sunt Χρι. (Christi)
membra Χρι. quid eantant. Amant
Desiderando cantant. Aliquando

In this speeimen, as very eommonly occurs, the original writing is much larger than the modern; the modern lines and letters do not eover those of the old MS., but they follow the same order. In other speeimens the new writing is transverse; in some, the old page is turned upside-down. Sometimes, where the old page is divided into columns, the new writing is earried over them all in a single line; sometimes the old page is doubled, so as to form two pages in the new MS.; sometimes it is cut into two or even three pages. The most perplexing case of all for the decipherer is that in which the new letters are of the same size and are written upon the same lines with the original. Examples of this are rare, and, even when they occur, the difference between the form of the ancient eharacters, ordinarily uncial, and that of the modern, is a great aid to the decipherer. Some variety, also, is found in the langnage of the palimpsests. In those in the western libraries, the new writing is almost invariably Latin, while the original is sometimes Greek and sometimes Latin. In the palimpsests discovered in the east, the original is usually Greek, the new writing being sometimes Greek, sometimes Syriac, sometimes Armenian; and one P. whose material is papyrus is found in whieh the original was the enchorial Egyptian language, while the modern writing is Greek.

The possibility of turning palimpsest MSS. to aeeount in extending our store of ancient literature was suggested as far back as the days of Montfaueon; but the idea was not praetically earried out till the latter part of the 18th e. The first P. editor was a German seholar, Dr. Paul Bruns, who having discovered that one of the Vatican MSS. was a P., the effaced matter of which was a fragment of the 91st book of Livy's *Roman History*, printed it at Hamburg 1773. In the field of diseovery thus opened by Bruns, little progress was made until the following century, when Dr. Barrett of Trinity College, Dublin, published his P. Fragments of Matthew's Gospel, and when P. literature at once rose into interest and importance in the hands of the celebrated Angelo Mai (q.v.). A detailed aceount of Mai's sueeesses is given below, with the principal publications in this curious department of letters (for the history of Mai's personal labors, see Mai, Angelo). The great historian Niebuhr about the same time applied himself to the subject, and was followed by Blume, Pertz, Gaupp, and other German seholars, whose labors, however, were mostly confined to the department of ane. Roman law. More reeently, the discoveries of Dr. Tischendorf in biblical literature, and those of Dr. Cureton in sacred and profane literature, have added importanee to the palimpsest

MSS. supposed to remain in the monasteries of the Levant. Herr Mone has had similar success in the department of liturgical literature, and Dr. Frederick Augustus Pertz, son of the scholar above mentioned, may be said to have carried to its highest point the interest which attaches to these curious researches, by editing from a *thrice-written palimpsest* a considerable series of fragments of the Roman annalist Gaius Granius Licinianus.

It remains to enumerate the most important P. publications which have hitherto appeared, distributed according to the language of the effaced original:

I. Greek Palimpsests.—Among these, the first place belongs to the Greek biblical palimpsests, the earliest of which was (1) *Fragments of the Gospel of St. Matthew*, in fac-simile as well as in *ordinary* type, printed from a palimpsest MS. of Trinity College, Dublin, by the Rev. I. Barrett, D.D. (4to, Dublin 1801). The original writing appears to be of the 6th c. Dr. Barrett's transcript of the text has not proved in all respects correct, but the original has since been carefully re-examined, and the ancient writing fully brought out. It is chiefly, however, to a collection of Syriac MSS. brought from the east that we are indebted for the more recent P. restorations of the ancient biblical readings. In this line the chief discoverer has been Dr. Constantine Tischendorf. From his pen we have (2) the celebrated *Codex Ephremi* or *Codex Regius* of the Royal Library at Paris. This MS. has been early observed to be P., and the original Greek text was collated in part by Wetstein and by Küster. It was still more carefully examined by M. Hase 1835; and finally, 1840, by Dr. Tischendorf, by whom the New Test. was printed 1843, and the fragments of the Old 1845. The modern writing of this P. consisted of the works of St. Ephrem the Syrian. (3) *Fragmenta Sacra Palimpsesta* (4to, Leipzig 1855), containing fragments of the Books of Num., Deut., Josh., Judges, Kings, Is., together with 48 pages of fragments of the New Test., the Gospels, the Acts, and the Epistles of Paul to the Corinthians and to Titus. The modern writing of these palimpsests was partly Greek, partly Armenian and Arabic. (4) *Fragmenta Evangelii Lucæ et Libri Genesis* (4to, Leipzig 1857). The fragments of Luke's Gospel amount to 95 pages. The vol. contains also fragments of John's Gospel and of Ezekiel and the Third Book of Kings. The modern writing is partly Syriac, partly Coptic. With these biblical palimpsests (5) may be classed another, the original of which, however, contains not only some Greek fragments, but also portions of the ancient Gothic version of the Bible by Ulphilas. The MS. from which this is taken is known from its place in the Wolfenbüttel Library as the *Codex Guelpherbytanus*. It was noticed first 1755 by Knittel, by whom a portion of the Gothic version was pub. 1762. These fragments were reprinted 1772, again 1805. The modern

writing of the MS. consisted of the *Origenes* of Isidorus Hispalensis. A large addition to the text of Ulphilas was made 1817 by Mai and Castiglione, from palimpsests discovered in the Ambrosian Library at Milan; and the whole have since been combined into one ed. by Dr. Gabelentz, and finally by Dr. Massmann (4to, Stuttgart 1855). Some interesting Greek liturgical remains were edited by F. I. Mone (Frankfort 1850), from a P. discovered at Carlsruhe.

In Greek classical literature, also, we owe something to the labors of P. editors. From one of the Syriac MSS. above referred to, Dr. Cureton has edited large fragments of the *Iliad* of Homer, amounting in all to nearly 4,000 lines; and though all these were known before, yet the text is of utmost value as a source of criticism, being certainly of much greater antiquity than the very earliest known MSS. of the *Iliad*. A still larger and more original contribution to Greek classical literature was made by Mai in the 5th vol. of his *Scriptorum Veterum Nova Collectio* (Rome 1831–38). From a very large P. discovered in the Vatican Library, he has printed in this vol. copious fragments of almost all the Greek writers on Roman history—from the lost books of Polybius no less than 100 4to pp.; 130 pp. of Diodorus Siculus; 64 of Dionysius of Halicarnassus; 100 of Dion Cassius; together with considerable fragments of Appian, Iamblichus, Dexippus, Eunapius, and others. This is, perhaps, after the *De Republica* of Cicero, the most important accession to the existing store of classic learning which the palimpsests have hitherto supplied.

II. Latin Palimpsests.—(1) The earliest fragment of Latin literature printed from a P. original is the portion of the 91st book of *Livy* above referred to, pub. at Hamburg and also at Rome 1773. It was re-edited in a more complete form by Niebuhr 1820. (2) Of the Latin palimpsests edited by Mai, the earliest were some fragments of lost Orations of Cicero, from two different palimpsests in the Ambrosian Library at Milan; in the latter of which, the second writing consisted of the acts of the Council of Chalcedon. These Orations were published in two successive vols. 1814. (3) Eight Orations of Symmachus (1815). (4) The Comedies of Plautus, including a fragment of the lost play entitled *Vidularia* (1815). (5) The works of M. Corn. Fronto, together with the Epistles of Antoninus Pius, Lucius Verus, M. Aurelius, and others (1815). (6) The celebrated Dialogue of Cicero, *De Republica*, from a P. of the Vatican, the modern writing of which is the commentary of St. Augustine on the Psalms. There is none of Mai's publications which presents his critical abilities in so favorable a light as this precious volume, which appeared at Rome 1821. (7) Soon after the *De Republica*, he published another vol. from P. sources, the most important of whose contents were some fragments of ancient Roman law, which prepared the way for the more distinguished success of Niebuhr, who. in a P. of the library of Verona,

recognized a portion of (8) the *Institutiones* of Gaius, and procured an accurate transcript for the press, printed Berlin 1820. The latest considerable Latin publication in this department is (9) *Gai Granii Liciniani Annalium quæ supersunt* (Berlin 1857), edited from a P. of the British Museum by the younger Pertz. This P., as above stated, is a thrice-written codex, the earliest and original contents being the *Annales* of Gaius Granius. The second writing was also in Latin, and the work is a grammatical treatise, of which the chapters *De Verbo* and *De Adverbio* are still legible. The most modern writing is Syriac, in the cursive character. Gaius Granius is a writer named by Microbius, of whom nothing else is known.

It will be gathered from the above that all the ancient works recovered by means of palimpsest MSS. are fragmentary, and one is naturally led to rate at a low value the result thereby obtained. But it must be remembered that, in some of the departments to which these fragments belong, every scrap, no matter how minute, has an independent value. So it is, e.g., in biblical remains —a single text may present a valuable reading, the merest fragment may throw light on an important critical question. In history, in like manner, a small fragment may disclose an interesting fact, or supply a significant commentary on facts otherwise ascertained. And as regards critical uses especially, it must not be forgotten that the obliterated text of the palimpsest MSS. mostly far exceeds in antiquity the very oldest known codices which we possess, and is, probably, second only in age to the papyri of Herculaneum.

The method of treating palimpsest MSS., with a view to deciphering their contents, has been fully described by different editors. Mai, after having washed the P. with an infusion of galls, exposed it to the light and air, and usually found this sufficient for his purpose. Peyron washed the parchment in water, afterward in dilute muriatic acid, and finally in prussiate of potash. A mixture compounded on this principle is called from its inventor, M. Gioberti, *Tinctura Giobertina.* Sometimes the same treatment does not succeed equally well on both sides of the parchment; the inner surface, from its softer texture, sometimes requiring a more active preparation. When the ink contained animal substances, as milk, or the blood of the cuttle-fish, Dr. Mone plunged the parchment in a close vessel filled with oil, which he heated to a temperature of 400° R. In the prefaces of Mai's vols. will be found many interesting facts illustrating the difficulties which attend this branch of literary labor.

PALIN-, prefix, *păl-ĭn* [Gr. *palin*]: again; back.

PALINDROME, n. *păl′ĭn-drōm* [Gr. *palin*, back or again; *dromos*, a race—from *dramein*, to run]: word, verse, or sentence which is the same when read either forward or backward, e.g., *madam*. This kind of verse is very common in Latin; the following are examples:

Si bene te tua laus taxat sua lauté tenebis.
Et necat eger amor non Roma rege tacente,
Roma reges una non anus eger amor.

A Roman lawyer gets the credit of the following:

Si nummi immunis,

which Camden translates:

'Give me my fee, and I warrant you free.'

It is said that in the reign of Queen Elizabeth a certain lady of rank, having been compelled to retire from the court on account of some *fama*, the truth of which she denied, took for her motto:

Ablata at alba.
'Retired but pure.'

The English language has few palindromes, but one at least is inimitable. It represents our first parent politely introducing himself to Eve in these words:

'Madam, I'm Adam.'

Compare Henry B. Wheatley's book on *Anagrams* (1862).

PALING: see under PALE 2.

PALINGENESIA, n. *păl′ĭn-jĕ-nē′zhĭ-ă*, or PALINGENESIS, n. *păl′ĭn-jĕn′ĕ-sĭs* [Gr. *palin*, again; *gĕnĕsis*, a beginning, birth]: a new or second birth or creation; inherited evolution. PAL′INGENET′IC, a. *-ĕt′ĭk*, of or pertaining to.—*Palingenesia* is a term that appears to have originated among the Stoics, who employed it to denote the act of the Demiurgus, or Creator, by which, having absorbed all being into himself, he reproduced it in a new creation. The occurrence of the word in the New Test. (Titus iii. 5, where it is used to denote regeneration, the new birth of the soul) has given it a place in Christian theology, and divines have variously used it to express the resurrection of men, the new birth of the individual soul, and the restoration of the world to its perfect state, which it lost by the Fall—'the new heavens and the new earth, wherein dwelleth righteousness.' Naturalists have applied the term to designate the great geological changes which the earth has undergone, and the transformations in the insect kingdom, e.g., of caterpillars into butterflies, etc.

PALINODE, n. *păl′ĭn-ōd* [Gr. *palinōdĭă*, a recantation —from *palin*, again; *ōdē*, a song]: piece of poetry in which a poet retracts the invectives or sentiments contained in a former production. PAL′INO′DIST, n. *-ō′dĭst*, one who writes palinodes.—P., in the law of Scotland, is a peculiar practice by which, in actions for damages on account of slander or defamation, the pursuer may conclude not only for damages, but for P., i.e., a solemn recantation.

PALINURUM, *pâ-lē-nô′rŭm*, or CAPO PALINURO, *pâ-lē-nô′ro:* promontory on the Italian coast, in the dist. of Lucania, bordering the Tyrrhenian Sea; lat. 40° n., long. 15° 15′ e. Here, according to tradition, Palinurus, the pilot of Æneas, was buried, and his tomb, now in ruins, was built. Only a short distance from this point, two great naval disasters have occurred: a Roman fleet of 150 vessels was lost B.C. 253, and a large number of ships under the command of Octavius were destroyed B.C. 36.

PALINURUS, n. *păl-ĭ-nūr′ŭs* [L.]: in *myth.*, name of the pilot of Æneas; he was drowned just before the Trojan fleet arrived at Cumæ.

PALINURUS, n. *păl-ĭ-nūr′ŭs:* in *zool.*, rock-lobster; spiny-lobster; the single genus of the family *Palinuridæ.*

PALISADE, n. *păl′ĭ-sād*, or PALISADO, n. *păl′ĭ-sā′dō* [F. *palissade*, a stake, a hedgerow of trees—from It. *palizzata*—from L. *palus*, a pole or stake]: in *fort.*, a paling or barrier of pointed stakes of strong timber driven firmly into the ground: V. to inclose or defend by driving pointed stakes into the ground. PAL′ISA′DING, imp. PAL′ISA′DED, pp.—See FORTIFICATION (Stockade).

PALISANDER, *păl-ĭ-săn′dėr* (or PALISSANDER, *păl-ĭs-săn′dėr*), WOOD: continental European name for Rosewood (q.v.). By some of the French cabinet-makers the name *bois de Palisandre* is applied also to violet wood and to a kind of striped ebony.

PALISSY, *pâ-le-se′*, BERNARD: French potter, famous for his glass paintings and beautiful figured pottery: 1510–89; b. near Agen, present dept. of Lot-et-Garonne, France; of parents who were poor. In youth he was apprenticed to a potter. He made chemical researches for improvement of his art, and made many journeys through France and Germany for the same purpose; at the same time carrying on the business of a land-surveyor. An enamelled cup of 'Faience,' which he saw by chance, inspired him with the resolution to discover the mode of producing white enamel. Neglecting all other labors, he applied himself to investigations and experiments patiently through 16 years—a pathetic search, for all the potters of n. Italy knew the secret of the white enamel, and from them he might have learned the process which he so laboriously sought. He had by this time exhausted all his resources, and for want of money to buy fuel was reduced to the necessity of burning his household furniture piece by piece; his neighbors laughed at

him, his wife overwhelmed him with reproaches, and his starving family surrounded him crying for food; but in spite of all these discouragements, he persisted in the search, which in the end brought success. A few vessels adorned with figures of animals, colored to represent nature, sold for high prices, and enabled him to complete his investigations, after which he became famous; and, though a strict and unwavering Huguenot, was protected and encouraged by the king and the nobility, who employed him to embellish their mansions with specimens of his art. He was lodged on ground afterward occupied by a part of the Tuileries, and was specially exempted by Queen Catharine from the massacre of St. Bartholomew, more from a regard to her own benefit than from kindness. 1575, Mar., he began a course of lectures on nat. history and physics, and was the first in France to substitute positive facts and rigorous demonstrations for the fanciful interpretations of philosophers. In the course of these lectures, he gave (1584) the first right notions of the origin of springs and the formation of stones and fossil shells, and strongly advocated the importance of marl as a fertilizing agent. In 1588, after 45 years of service of the court, P., nearly 80 years old, was arrested and thrown into the Bastile as a Huguenot and heretic: King Henry III. offered him freedom and reward for recantation; but P. disdained the bribe. He died, however, before his sentence was pronounced.

P. left a collection of objects of nat. history, the first that had been formed in France. His works are now almost beyond price, and his ornaments and arabesques are among the most beautiful of the 'renaissance.' His writings were on religion, agriculture, and nat. philosophy; they are highly esteemed. As a sincere, faithful, and courageous man, he was no less eminent than as an artist. See Morley's *Palissy the Potter*.

PAL'ISSY-WARE: see PALISSY, BERNARD.

PALIURUS, *pā-lĭ-ū'rŭs* or *păl-ĭ-ūr'ŭs:* genus of trees and shrubs of nat. order *Rhamnaceæ*, nearly allied to *Zizyphus* (see JUJUBE), but very different in the fruit, which is dry, orbicular, and girded with a broad membranous wing. *P. aculeatus* is often called CHRIST'S THORN, and, by the Germans, JEWS' THORN (*Judendorn*), from an imagination that it supplied the crown of thorns with which our Saviour was crowned. It is a deciduous shrub or low tree, with slender, pliant branches and ovate, 3-nerved leaves, each of which has two sharp spines at the base, one straight and the other re-curved. It is a native of the countries around the Mediterranean, of India, and many parts of Asia. It is used often for hedges in Italy and other countries; its sharp spines and pliant branches admirably adapting it for this purpose. The fruit has a singular appearance, being flat and thin, attached by the middle to the foot-stalk, the middle being raised like the crown of a hat, while the expansion resembles the brim. The seeds are sold by the

druggists of the east, and are used medicinally, but their qualities are doubtful. This shrub is common in shrubberies in England, being very ornamental when in flower, but the fruit does not ripen.

Christ's Thorn (*Paliurus aculeatus*):
a, ripe fruit.

PALK STRAIT, *pawk*, or PALK'S PAS'SAGE, *pawks:* northern portion of the passage between the s. coast of Hindustan and the island of Ceylon: its southward continuation is the Gulf of Manaar (q.v.). It is from 40 to 80 m. in width, and 80 m. long. It is so shallow—in some places no more than two fathoms in depth—that it cannot be navigated in safety by large vessels. There are several pearl fisheries.

PALL, n. *pawl* [L. *palla*, a long and wide upper garment worn by Roman ladies; *pallĭŭm*, a coverlet, a cloak: AS. *pæll*, a purple cloth: W. *pall*, a mantle: Bret. *pallen*, a coverture: Gael. *peall*, a covering]: ensign or mantle of state for a high ecclesiastic (see PALLIUM). A pall is also an ample covering of black velvet or other stuff cast over a coffin borne to burial.—In the Rom. Cath. Chh., a pall is one of the coverings used at the altar in celebration of the mass. Primitively, as appears from Optatus and other early writers, the altar was covered with a large linen cloth—called by the Latins *pallium*, and by the Greeks *eileton*—the extremities of which were folded back, to cover the bread and wine prepared for the celebration of the eucharist. In later times, a separate covering was employed for the sacramental chalice, to which latter the name pall is now reserved in the Rom. Church. The modern Roman pall is a square piece of linen cloth

—sometimes limber, sometimes made stiff by inserting pasteboard—sufficiently large to cover the mouth of the chalice. The upper surface is often of silk embroidered, or of cloth of gold. The surface in contact with the chalice must always be of linen. In *her.*, a figure representing the pallium, the upper part of a saltire joined to the lower part of a pale; used in the arms of ecclesiastical sees: V. to cover or invest. PALLIAL, a. *păl'ĭ-ăl*, pertaining to a pall or mantle. PALL-BEARERS, the broad ribbons attached to a funeral pall and held by relatives or friends; also those who hold the ribbons or the ends of the pall in the funeral procession, or who walk by the side of the coffin—usually the most distinguished or most intimate friends of the deceased, but not related to him by blood. PALLIAL IMPRESSIONS, the impressions left by the mantle on the interior of bivalve shells.

PALL, n. *pawl* [L. *palus*, a pole or stake]: in *shipbuilding*, strong short pieces of iron or wood so placed near the capstan or windlass as to prevent its recoil or giving way.

PALL, v. *pawl* [W. *pallu*, to fail; *pall*, loss of energy: comp. Ir. *spaillead*, a check, abuse: another form of *fail* or *fall*]: to cloy or satiate so as to lose piquancy and relish; to weaken or impair; to dispirit; to grow vapid; to lose strength or taste. PALL'ING, imp. PALLED, pp. *pawld:* ADJ. cloyed; weakened.

PALLA, n. *păl'lă* [L.]: in *anc. Rome*, the long and wide upper garment worn by Roman ladies.

PALLA'DIAN ARCH'ITECTURE: see PALLADIO.

PALLADIO, *pâl-lâ'de-o*, ANDREA: famous Italian architect: 1518, Nov. 30—1580, Aug. 6; b. Vicenza. After having studied with the greatest care the writings of Vitruvius and the monuments of antiquity at Rome, he settled in his native city, where he acquired reputation first by his restoration of the Basilica. Pope Paul III. then invited him to Rome, to supervise the works at St. Peter's; but the death of the pope before P.'s arrival, caused his return home. He was employed many years in constructing numerous buildings in Vicenza and the neighborhood. His style, known as the Palladian, is a composite, characterized by great splendor of execution and justness of proportion; and it exercised immense influence on the architecture of n. Italy. His principal works are the Rotonda Capra, outside Vicenza; the Palazzo Chiericado and the Palazzo Tiene, in the city; the Palazzo della Ragione, deemed by some critics his finest work in Vicenza; the Palazzo Barbara, at Maser, in the Trevigiano; the Teatro Olympico, at Vicenza (his last work); the Palazzo at Montagnana, for Francesco Pisana; the churches of San Giorgio Maggiore aud Il Santissimo Redemptore at Venice; the atrium and cloister at the convent Della Carità, and the façade of San Francesco della Vigna, in the same city. His villa of Capra has been often imitated. P. died at Vicenza. He wrote a work on architecture, which is highly prized; best ed. Vicenza, 4 vols., 1776.

PALLA'DIUM [fr. *Pallas*], (sym. Pd, at. wt. 106·6 sp. gr. 12·1): one of the so-called noble metals, a rare metal of steel-gray color, found in very small grains in auriferous and platiniferous sand, and in its color and ductility closely resembling platinum. It is not fusible in an ordinary wind-furnace, but melts at a somewhat lower temperature than platinum; and when heated beyond its fusing-point, it volatilizes in green vapor. It undergoes no change in the open air at ordinary temperatures; but at a low red heat it becomes covered with a purple film, owing to superficial oxidation. It is soluble in nitric and iodic acids, and in aqua regia. It combines readily with gold, which it has the property of rendering brittle and white. When alloyed with twice its weight of silver, it forms a ductile compound, used in construction of small weights; Prof. Miller states that it 'has been applied in a few cases to the construction of graduated scales for astronomical instruments, for which, by its whiteness, hardness, and unalterability in the air, it is well adapted;' its scarcity must, however, prevent its general use for this purpose. It was discovered 1803 by Wollaston in the ore of platinum, of which it seldom forms so much as 1 per cent. Another source of this metal is the native alloy which it forms with gold in certain mines in Brazil, and which is termed *ouro poudre;* and it is from this alloy that the metal is chiefly obtained. P. forms with oxygen a protoxide, PdO, the base of the salts of the metal, a dioxide, PdO_2; and, according to some chemists, a suboxide, Pd_2O. On exposure to sufficient heat, these compounds give off their oxygen, and yield the metal. The salts of the protoxide are of brown or red color. PALLADIOUS, a. *păl-lā'dĭ-ŭs*, and PALLA'DIC, a. *-lā'dĭk*, applied to certain compounds of the metal palladium.

PALLADIUM, n. *păl-lā'dĭ-ŭm* [Gr. and L. *Pallas*, Minerva, the goddess of war and wisdom]: among the *anc. Greeks and Romans*, an archaic wooden image of Pallas, a goddess generally identified with Athene or Minerva, on the careful keeping of which in a sanctuary the public welfare was believed to depend. The P. of Troy particularly is celebrated. According to the current myth, it was thrown down from heaven by Zeus, and fell on the plain of Troy, where it was picked up by Ilus, founder of that city, as a favorable omen. In course of time, the belief spread that the loss of it would be followed by the fall of the city; it was therefore stolen by Odysseus and Diomedes. Several cities afterward boasted of possessing it, particularly Argos and Athens. Other accounts, however, affirm that it was not stolen by the Greek chiefs, but carried to Italy by Æneas; and the Romans said that it was preserved in the temple of Vesta, but so secretly that even the Pontifex Maximus might not behold it. All images of this name were somewhat coarsely hewn out of wood.—P. is used figuratively to denote any particular law or privilege regarded as the safe-guard of a people's liberties.

PALLADIUS, *păl-lā′dĭ-ŭs*, RUTILIUS TAURUS ÆMILIANUS: Roman author: 4th c. after Christ, under Valentinian and Theodosius. He wrote a work, *De Re Rustica* (On Agriculture), 14 books, the last of which is a poem of 85 elegiac couplets. It is, in a literary and grammatical view, full of faults; but as it was a complete calendar of Roman agriculture, it was very useful for its time, and was read and followed during the middle ages. P. borrowed largely from his predecessors. The best ed. is that by J. G. Schneider in *Scriptores Rei Rusticæ Veteres Latini* (4 vols. Leip. 1794).

PAL′LAS: one of the smaller planets.—Also in anc. mythology, a goddess (see MINERVA).

PALLAS, *pâl′lâs*, PETER SIMON: traveller and naturalist: 1741, Sep. 22—1811, Sep. 8; b. Berlin, where his father was a physician. He studied medicine, nat. history, and other branches of science, at the universities of Berlin, Göttingen, and Leyden. He gained high reputation by the publication of *Elenchus Zoophytorum* (Hague 1766), a work still much valued; *Miscellanea Zoologica* (Hague 1766); and *Spicilegia Zoologica* (2 vols. Berlin 1767–1804). Empress Catharine invited him, 1768, to St. Petersburg, where honors were conferred on him. Subsequently he was appointed naturalist to a scientific expedition in Siberia, there to observe the transit of Venus. P. spent six years on this journey, exploring the Ural Mountains, the Kirghis steppes, great part of the Altaian range, and the country around Lake Baikal as far as Kiachta, great part of Siberia, and the steppes of the Volga, returning to St. Petersburg 1774, with extraordinary treasure of specimens in nat. history, nucleus of the Museum of the Acad. of St. Petersburg. His travels (*Reisen durch verschiedene Provinzen des Russ. Reichs*) were published at St. Petersburg (3 vols. 1771–76); followed by *Sammlung historischer Nachrichten über die Mongol. Völkerschaften* (2 vols. St. Petersb. 1776–1802), and *Neue nordische Beiträge zur physikalischen und geographischen Erd- und Völkerbeschreibung, Naturgeschichte und Oekonomie* (6 vols. St. Petersb. 1781–93). Without positively neglecting any branch of nat. history, he then gave his attention particularly to botany; and his magnificent *Flora Rossica* (St. Petersb. 1784–88), a work which he was not able to complete, and *Species Astragalorum* (14 parts, Leip. 1800–04), were among the results of his studies. He published also *Icones Insectorum præcipue Rossiæ Sibiriæque Peculiarium* (Erlangen 1781, 83, and 1806); and contributed to a glossary of all the languages of the Russian empire, pub. St. Petersburg. As he wished to live in the Crimea, Empress Catharine presented him with a estate in the finest part of that peninsula, where he resided usually from 1796. His *Travels in the South of Russia* were published 1799 (2 vols. Leip., with vol. of plates). After the death of his wife, he went to Berlin, where he died. P.'s large and valuable work on the Fauna of Russia has not yet been published.

PALLAVICINO, *pâl-lâ-ve-chē′no* (or PALLAVICINI, *-nē*), PIETRO SFORZA, Cardinal: Italian historian: 1607, Nov. 20—1667, June 5; b. Rome; son of Marquis Alessandro P. of Parma. Much to the disgust of his father, he took priest's orders, and held several important ecclesiastical appointments during the pontificate of Urban VIII. In 1637 he became a member of the Jesuit Soc., and was created cardinal 1657 by Pope Alexander VII. He died at Rome. P. was a fine scholar, and often presided in the famous Roman acad. of the *Umoristi*. The best known of all his writings is *Istoria del Concilio de Trento* (Rome 1656–7), intended as a reply to the still more celebrated and liberal, though by Rom. Catholics deeply suspected, work of Paul Sarpi. Among his works are: *Vindicationes Soc. Jes.* (Rome 1649); *Arte della Perfezione Cristiana—I Fasti Sacri* (the unpublished MS. is in the library of Parma); *Ermengilda*, a tragedy (Rome 1644); *Gli Avvèrtimenti Grammaticali* (Rome 1661); *Trattato dello Stilo e del Dialogo* (Rome 1662); and *Lettere* (Rome 1668).

PALLEE, *pâl′lē:* town of Rajputana, in Judpore; on the right bank of a branch of the Luni river, lat. 25° 48′ n., long. 73° 24′ e. It is an entrepôt for the opium sent from Malwa to Bombay, and is the seat of extensive commerce. It imports European manufactured goods extensively. Pop. estimated about 50,000.

PALLESCENT, a. *păl-lĕs′ĕnt* [L. *palles′cens* or *palles-cen′tem*, turning pale]: in *bot.*, growing pale.

PALLET, n. *păl′ĕt* [F. *palette;* It. *paletta*, a fire-shovel —from L. *pala*, a spade (see PALETTE)]: an instrument, generally made of a squirrel's tail, used in working gold-leaf; a certain piece of the mechanism of a watch; among *potters*, a shaping-tool.

PALLET, n. *păl′ĕt* [prov. F. *paillet*, a heap of straw—from F. *paille*, straw—from L. *palĕă*, chaff]: a small and humble bed.

PALLET, n. *păl′ĕt* [dim. of *pale*]: in *her.*, a diminution of the pale, being only one-half of it in breadth.

PALLIAL: see under PALL 1.

PALLIASSE, n. *păl-yăs′:* see PAILLASSE.

PALLIATE, v. *păl′lĭ-āt* [L. *pallĭātus*, cloaked—from *pallĭŭm*, a cloak or mantle: It. *palliato*, cloaked, disguised]: to cover with excuses, as with a *cloak* or *mantle;* to soften or lessen, as an offense, by favorable representations; to lessen or abate, as a disease; to ease without curing. PAL′LIATING, imp. PAL′LIATED, p. PAL′LIA′TION, n. *-ā′shŭn*, the act of palliating; the state of being palliated; extenuation by favorable representations. PAL′LIATIVE, a. *-ā-tĭv*, serving to soften or lessen by favorable representations; mitigating, as disease or suffering: N. that which extenuates or mitigates.—SYN. of 'palliate': to extenuate; hide; cloak; cover; conceal; lessen; abate; mitigate.

PALLID, a. *păl′lĭd* [L. *pallĭdus*, pale—from *pallĕō*, I am pale]: pale; wan; deficient in color. PAL′LIDLY, ad. *-lĭ*. PAL′LIDNESS, n. *-nĕs*, paleness; wanness.

PALLIOBRANCHIA′TA: see BRANCHIOPODA.

PALLISER, *păl′ĭs-ẽr*, Sir WILLIAM: 1830, June 18—1882, Feb. 6; b. Dublin, Ireland. He graduated from the Staff College, Sandhurst; entered the rifle brigade as an ensign 1855: 3 years later was connected with the 18th hussars; was promoted capt. 1859, major 1864, and sold his commission and left the army 1871. Among his inventions were numerous improvements in constructing fortifications and arming war vessels, a machine for changing smooth-bore cannon into rifled guns, thereby wonderfully increasing their efficiency, and an improved method of rifling heavy guns of wrought-iron. His greatest fame was secured by the invention of the P. projectiles for piercing the plates of armor-clad ships. He was knighted 1873 and received the cross of the Commander of the Crown of Italy 1875.

PALLIUM, n. *păl′lĭ-ŭm* [L. *pallĭŭm*, a cloak (see PALL 1)]: name given in the Rom. Cath. Church to one of the ecclesiastical ornaments worn by the pope, by patriarchs, and by archbishops. Its use is held by Rom. Catholics to have descended from a very early period. It is worn by the pope at all times, as a symbol of his reputed universal and abiding jurisdiction. By archbishops it cannot be worn until it has been solemnly asked for and granted by the pope, and even then only during the solemn service of the great church festivals, and on occasions of the ordination of bishops or of priests, and similar acts of the archiepiscopal order. The P. is now a narrow annular band of white woolen web, about three inches wide, upon which black crosses are embroidered, which encircles the neck of the abp., and from which two narrow bands of the same material depend, one falling over the breast, the other over the back of the wearer. Its material is the subject of much care and ceremonial: it is made wholly or in part from the wool of two lambs, blessed annually on the festival and in the church of St. Agnes. During the night of the vigil of the feast of St. Peter and St. Paul, the *pallia* made of this wool are placed on the altar above the tomb of these apostles, and on the feast of St. Peter and St. Paul are delivered by the pope to the sub-deacon, whose duty it is to keep them in charge. Every new archbishop, within three months of his consecration, is obliged to apply in person or by proxy to the pope for the P.; nor is it lawful for him, until he shall have received it, to exercise any act of what is properly archiepiscopal, as distinguished from episcopal, jurisdiction; e.g., he cannot call a *provincial* synod. The P. cannot be transferred from one abp. to another, but must be received direct from the pope. On the abp.'s death, his P. is interred with him. Its use is held to symbolize the office of the 'good shepherd' bearing the lost sheep on

his shoulders, and is connected by some writers with the vesture of the Jewish high-priest, Ex. xxviii. 4. In the mediæval church, the granting of the P. to abps. was one of the chief occasions of the tribute paid by the national churches to the support of the great central office and dignity of the papacy. In some sees, e.g., those of the great prince-bishops of the Rhine, the tribute was as much as 20,000 florins. Rom. Catholics, however, maintain that this tribute was not a *payment* for the P., but an *offering* to the holy see, made on occasion of the grant of that emblem of jurisdiction.—*Pallium* in *zool.* is the fleshy covering lining the interior of the shells of bivalves.

PALL-MALL, n. *pĕl-mĕl′* [OF. *pale-maille*, a game similar to the modern croquet: O. It. *pallamaglio*—from It. *palla*, a ball, and *maglio*, a hammer: F. *mail:* L. *malleus*]: a certain game in which a *ball*, with the stroke of a *mallet*, is driven through a series of iron rings: a street in London, so called from having once been a place for playing the game. MALL, a public walk in St. James's Park, London, and Central Park, New York: see MALL: BALL.

PALLOR, n. *păl′ẽr* [L. *pallor*, paleness (see PALE 1)]: paleness.

PALM, n. *pâm* [Gr. *palămē;* L. *palma;* W. *paŧ;* AS. *folm*, the flat of the hand: F. *paume*, the palm of the hand: L. *palpārĕ;* Icel. *falma*, to grope, to feel for with the hands]: the flat open front of the hand; the broad triangular part of an anchor at the extremity of each arm; a measure of length of three inches (see below); a sail-maker's thimble, so called from being held in the palm of the hand: V. to touch with the hand; to conceal in or by the palm of the hand; to impose by fraud, usually followed by *off*, as, to palm *off;* to stroke with the hand. PALMING, imp. *pâm′ĭng*, imposing upon by fraud; cheating. PALMED, pp. *pâmd*. PALMAR, a. *păl′mâr*, of the breadth of the hand; of or relating to the palm.

PALM, n. *pâm* [L. *palma*, the palm, a tree with broad-spreading leaves like the palms of one's hands—the Italian palm being one of the palmate species, and not pinnate like the date-palm: F. *palme*, the branch of a palm-tree]: tree of hot climates and of many species, branches of which in some countries were borne as tokens of victory or rejoicing; a symbol or evidence of superiority or success; the *Palmæ* or palm tribe (see PALM). PALMACEOUS, a. *păl-mā′shŭs*, belonging to the palm tribe. PALMAR, a. *păl′mâr*, of or relating to the palm. PALMER, n. *pâm′ĕr*, a pilgrim carrying a palm-branch in sign of his return from the Holy Land (see below). PALMER-WORM (see below). PALMY, a. *pâm′ĭ*, bearing palms; flourishing; prosperous. PALMATE, a. *păl′māt*, or PAL′MATED, a. *-māt′ĕd* [L. *palmātus*, marked with the palm of a hand]: in *bot.*, having the shape of the open hand with the fingers apart, as in some leaves; entirely webbed. PALMA CHRISTI, n. *păl′mă krĭs′tī* [L the palm-tree of Christ]: the Castor-oil (q.v.) Plant. PALM-OIL (see OIL PALM). PALM-WINE, the fermented juice of the flowers and stems of the cocoa-nut tree, also of the oil palm, and of some other species. Its name in India is *toddy*. In Africa, scarcely any other fermented liquor is made. PALMACITES, n. plu. *păl′mă-sīts*, a general term for any fossil stem, leaf, or fruit which exhibits some analogy or resemblance to any one of the existing palms. TO BEAR THE PALM, to be the best; to come off victorious.

PALM, n. *pâm* [Low Ger. *palme*, a bud, a catkin of the willow: Ger. *palmen*, the buds or eyes of the vine: Fin. *palmu*, the catkin of willow—from *palmikko*, a lock of hair]: the yellow catkin of the willow, the branches of which, from the name, are carried on Easter Sunday to represent the palm-branches of the East. *Note.*—The three preceding groups are connected, as may be seen from the roots, yet it has been thought better to separate them as has been done, for greater distinctness and easier apprehension.

PALM, *pâm* (*Palmæ* or *Palmaceæ*): natural order of endogenous plants, not excelled in importance by any order in the vegetable kingdom except Grasses. They are generally tall and slender trees, often of gigantic height, without a branch, and bearing at the summit a magnificent and graceful crown of very large leaves. The stem is sometimes, however, of humble growth, and more rarely it is thick in proportion to its height; sometimes, but rarely, it is branched, as in the Doom (q.v.) P.; and sometimes, as in Rattans (q.v.), it is flexible, and seeks support from trees and bushes, over which it climbs in jungles and dense forests, clinging to them by means of hooked spines. Some of the species with flexible stem attain prodigious length, ascending to the tops of the highest trees, and descending again. Rumphius asserts that they are sometimes 1,200 or even 1,800 ft. long. Whatever the form or magnitude of the stem

of a P., it is always woody, and the root is always fibrous. It is only toward its circumference, however, that the stem is hard, and there in many species it is extremely hard; but the centre is soft, often containing when young much starch (sago), and sometimes filled when old with a mass of fibres which can be separated without difficulty. Concerning the structure of the stem, see ENDOGENOUS PLANTS. The stem is generally marked externally with rings or scars, where former leaves have been attached; sometimes it is rough with the remaining bases of the leaves, and part of it is sometimes covered with their fibrous appendages. No other plants have leaves so large as many of the palms; the largest of all are those of some of the fan-leaved palms, but there are palms with pinnate leaves 50 ft. long and 8 ft. broad, and undivided leaves are seen 30 ft. long by 4 or 5 ft. broad. There are also small palms; and palms with flexible stems, which have small leaves. The number of the large leaves which form the crown of even the most magnificent P. is never great. Whatever the size or form of the leaves, they are always stalked, the stalk being often in dimensions equal to a large bough of a great oak. The leaves are commonly pinnated, the number of pinnules or leaflets being often very great; but about one-sixth of the whole number of known species of P. have fan-shaped leaves, and a few species have undivided leaves. The leaves are in all cases persistent, falling off in succession only as the P. advances in growth, and new ones are formed at the summit. The flowers are sometimes hermaphrodite, sometimes unisexual; the same tree having sometimes male, female, and hermaphrodite flowers, while other species are monœcious and others diœcious. The perianth has six divisions, three outer and three inner; there are generally six, rarely three, stamens; the ovary is composed of three carpels, distinct or united, each with one cell, containing one ovule. The flowers are small, but often produced in dense masses of very striking appearance. Humboldt reckons the number of flowers on a single P. (*Alfonsia amygdalina*) as about 600,000, and every bunch of the Seje P. of the Orinoco consists of about 8,000 fruits. The flowers are produced on scaly spadices, often much branched, and inclosed before expanding in leathery or wooden spathes, which are often very large and sometimes open by bursting with a loud explosion. The flowers of some palms emit a powerful odor, which attracts multitudes of insects. The fruit is sometimes a kind of berry, sometimes a drupe, with either fleshy or fibrous covering; and sometimes contains a very hard and bony nut. The fruit is sometimes only the size of a pea or cherry; sometimes, notwithstanding the smallness of the flowers, it is very large, of which the cocoa-nut is a familiar example.

Palms are natives mostly of tropical countries, being found almost everywhere within the tropics, and forming perhaps the most striking characteristic of tropical vege-

tation. Tropical parts of America particularly abound in them, producing a far greater number of species than any other part of the world. A few species are found in temperate regions; one species only, *Chamærops humilis*, being a native of Europe, and extending as far n. as lat. 44°, while the n. limit of the P. in Asia is about lat. 34°, and in N. America lat. 35° (see PALMETTO). In S. America, the s. limit of the P. is lat. 36°; in Australia, lat. 35°; in Africa, no native species is found further s. than lat. 30°; but in New Zealand, one species extends as far s. as lat. 38° 22′. Some of the species, however, in tropical America, grow in mountain regions bordering on the limits of perpetual snow. Some palms have very narrow geographical limits; the cocoa-nut P. is by far the most extensively distributed species. Some, like the cocoa-nut, grow in maritime, others in inland, districts: some grow on dry and sandy ground, others in the richest alluvial soil, and some in swampy situations; some in open districts, others in dense forests. Some species are usually found singly, some in groups; some even cover tracts of country in which no other tree appears.

The uses of the P. are many and various; there is almost no species incapable of some use. Tribes in the lowest grade of civilization depend almost entirely on particular species of P., e.g., the cocoa-nut P., for supply of all their wants. The fruit of some species is eaten; sometimes the fleshy part of the fruit, sometimes the kernel of the nut. The importance of the date and the cocoa-nut needs only to be alluded to; but in this respect they far excel the fruits of all other palms. A grateful beverage is made from the fruit of some palms (see ASSAI), consisting simply of a mixture of the pulp with water; but a kind of wine also can be obtained by fermentation (see DATE). A kind of beverage more generally used is the sap of palm-trees, either fresh or fermented (*palm-wine* or *toddy*), from which also a kind of spirits called Arrack (q.v.) is obtained by distillation; while from the fresh sap, boiled down, sugar is obtained—the *jaggery* of the E. Indies. The sap of various species of P. is collected and used for these purposes, and that of many others is probably not less suitable. The pulp of the fruit of some species, and the kernel of others, yield bland fixed oil useful for various purposes. See OIL PALM: COCOA-NUT. The soft and starchy centre of the stem of some palms affords a very important and abundant article of food: see SAGO. The terminal bud, or *cabbage*, of some species is boiled for the table; and though the taking of the bud is death to the tree, this is little regarded where vegetation goes on with a rapidity and luxuriance unknown in colder parts of the world. The young sprouts arising from the seeds of palms, when they have begun to vegetate, are another esculent of tropical countries. From the stems of some species of P., as the Wax P. (q.v.) of the Andes, and from the leaves of some, as the Carnahuba P. (q.v.), wax is obtained, used for the same purposes as bee's-wax. The wood of palms is used

in house-building, and for many other purposes; some affording very hard and beautiful wood for ornamental work, while others are suitable only for coarse purposes. The great leaf-stalks also are used for some of the purposes of timber. The stems of the most slender species are used for walking-sticks, etc., and, split or unsplit, for wicker-work: see RATTAN. The leaves of many palms are used for thatching houses. The spathes of some species are used as vessels or bags. The fibres of the leaf, the fibres connected with the leaf-stalk, the fibres of the rind of the fruit, and the fibres of the stem of different kinds of P. are used for making cordage, mats, nets, cloth, etc. The most important of these fibres are Coir (q.v.) or Cocoa-nut Fibre, Gomuto (q.v.) or Ejoo Fibre, and Piassaba (q.v.). The coarsest fibres are employed as bristles for making brushes, etc. Stripes of the delicate epidermis of the young unopened leaves of some S. American palms are twisted, and so used for making a kind of thread; hammocks made of which are highly valued: see ASTROCARYUM. The leaves of the Palmyra P. and Talipot P. are used in parts of the East for writing upon, an iron style being employed instead of a pen. One of the kinds of the resinous substance called *Dragon's Blood* is obtained from the fruit of a P. The Betel (q.v.) Nut, abounding in catechu, is the fruit of a P. The fruit of many palms is very acrid. The ashes of the fruits of some American species are used by the Indians as a substitute for salt, probably on account of potash, or some salt of potash, which they contain; and much potash may be obtained from the stems and leaves of palms. Vegetable Ivory (q.v.) is the kernel of the fruit of a P.; and somewhat similar to it in quality is the Coquilla Nut (q.v.). But a complete enumeration of the uses to which palms and their products are applied is almost impossible.

For some more important species of P., see separate titles. About 500 species are known; but it is probable that many are still undescribed. The most complete work on the P. is the monograph by Martius, *Genera et Species Palmarum* (3 vols. large folio, Munich 1823–45), a magnificent work, with 219 colored plates; but many new species have been discovered since its publication.

The cultivation of palms in hothouses is attended with great expense. Separate houses are allotted to them in a few gardens, of which the greatest is that at Kew, England. A very fine palm-house has been erected in the Botanic Garden of Edinburgh. Palms are cultivated in hothouses merely as objects of interest and taste, never for their fruit or any other product.

PALM: measure of length, taken originally from the width of the hand, measured across the joints of the four fingers. In Greece, it was known as *palaistē*, and was reckoned at 3 inches, or $\frac{1}{6}$ of a cubit, their standard unit. The Romans adopted two measures of this name —one was the Greek *palaistē* and was called *palmus minor;* the other, introduced in later times, was called

palmus major or *palma*, and was taken from the *length* of the hand, being therefore usually estimated at three times the length of the other. At the present day, this measure varies in a most arbitrary manner, being different in each country, and occasionally varying in the same country. The English P., when used at all, which is seldom, is considered to be the fourth part of an English ft., or 3 inches. The following is a list of the most common measures to which the name P. is given:

	Value in Eng. inches.
Greek *palaiste*, ... =	3·03375
Roman *palmus*, or lesser palm, ... =	2·9124
" *palma*, or greater palm, ... =	8·7372
English palm (1-4 of a foot), ... =	3·0000
Hamburg palm (1-3 of a foot), ... =	3·7633
Amsterdam 'round' palm, ... =	4·1200
" 'diameter' palm, ... =	11·9687
Belgian palm, Lombard palm, } properly the *decimetre*, =	3·9371
Spanish palm, or *palmo major*, ... =	8·3450
" " , or *palmo minor*, ... =	2·7817
Portuguese palm, or *palmo de Craveira*, =	8·6616

In Germany and the Low Countries, the P. is generally confined to wood-measurement: in Portugal it was formerly the standard of linear measure.

PALM, *pâm*, JOHANN PHILIPP: 1766–1806; b. Schorndorf: bookseller of Nuremberg, victim of Napoleonic despotism in Germany. In the spring of 1806, a pamphlet, *Deutschland in seiner tiefsten Erniedrigung* (Germany in Its Deepest Humiliation), which contained some bitter truths concerning Napoleon and concerning the conduct of the French troops in Bavaria, was sent by P.'s firm to a bookseller in Augsburg, in the ordinary course of trade, and, as P. to the last moment of his life averred, without any regard, on his part, to its contents. Napoleon's police traced it to the shop in Nuremberg. Later, P. was arrested and examined before Marshal Bernadotte, whose adjutant represented his arrest as the consequence of direct orders from Paris. An extraordinary court-martial at Braunau, whither he was removed, condemned him to death, without any advocate being heard in his defense. All intercession was in vain: Gen. St. Hilaire declared that the orders of the emperor were positive; and the sentence was executed at 2 o'clock on the same day on which it was pronounced. Subscriptions were raised for the family at St. Petersburg, in England, and in several German towns. Some French writers have endeavored to throw the blame of this murder on Marshal Berthier, instead of Napoleon.

PAL'MA: island: see CANARIES.

PALMA, *pâl'mâ:* capital of the island of Majorca (q.v.) and of the province of Baleares; on the s.w. coast of the island, on the Gulf of P., which, between Capes Figuera and Blanco, is 18 m. long, and extends 12 m. inland. The city is surrounded by orange plantations, and is walled and fortified. The houses, some of which are of

marble, are mostly of Moorish architecture, and a number of the streets are wide and regular. It is the see of a bishop, and contains a Gothic cathedral, simple but beautiful in style, and with a spire which, from its delicate and airy construction, is called the Angel's Tower. Besides other ecclesiastical edifices, the town contains an Exchange—a beautiful and ornate structure in Germano-Gothic—the governor's palace, an acad. of medicine and surgery, and a large number of excellent educational institutions, including three *colegios*. The port is small. Wool, silk, and the cordage for the Spanish navy are manufactured. Though one of the chief marts of Europe in the 13th c., Palma now has little commerce. Pop. (1900) 63,937.

PALMA, Giacomo, called Il Vecchio: Italian painter: b. probably, Serintola, near Bergamo, about 1480; d. Venice 1528. He is supposed to have been a pupil of Giovanni Bellini, but little is known regarding his life. It may be divined from the pictures that go by his name that he imitated one after another several great artists of the Venetian school and many of his works have been attributed to Giorgione, whose coloring he took for his standard of excellence. The Italian churches have multitudinous examples of paintings called 'Santa Conversagione' representing the Virgin and the Child, and the donor of the picture presented to them by his patron saint. Of these large compositions Palma Il Vecchio painted very many. He was also successful in mythological subjects, and his landscape backgrounds are exquisite. His works place him among the foremost painters of his time. Some of his best known paintings are *Adoration of the Shepherds; The Holy Family; Mars and Venus; The Mystical Marriage of Saint Catherine; Divine and Heathen Love; Portrait of Andrea Palladio in his Youth.*

PALMA, Giacomo, called Il Giovane: Italian painter, grand-nephew of the Elder Palma: b. Venice about 1544; d. there 1628. His early work was excellent, comparing in fresh coloring with Titian, who greatly influenced him. Later his vicious mannerism grew so as to be a predominating feature of his work. Hence Lanzi called him the last good and first bad painter of Venice.

PALMA, Ricardo: Peruvian author: b. Lima, Peru, 1833, Feb. 7. He was exiled to Chile in 1860 as a result of implication in a political revolt, but upon his return became secretary to President Balta. Later he served as senator and then was assistant in the National Library. After the sack of the library by the Chilcans in 1881 he reorganized it, gathered the remaining fragments, and assisted by gifts from foreign governments succeeded in re-opening the library in 1884. He is the author of several works of fiction, some poetry, and the historical work *Anales de la Inquisición de Lima* (1863). Since 1870 he has been occupied in recording the traditions and legends of Peru.

PALMA, Thomas Estrada: Cuban patriot: b. Bayamo, Cuba, 1835, July 15; d. 1908, Nov. 4. He studied law, but did not enter practice; during the revolution of 1868-78, known as the Ten Years' war, rose to be a general in the Cuban forces; and after nearly nine years of service was captured and imprisoned in Spain until the close of the insurrection. At the time of his imprisonment he had succeeded Cespedes in the rather empty honor of president of the Cuban provisional government. After his release he went to Honduras, where he became postmaster-general of the republic. Later he removed to the United States, where he opened a school for Latin-Americans at Central Valley, N. Y. This institution he successfully conducted until the beginning of a fresh revolt in Cuba in 1895, when he was elected delegate-at-large and minister plenipotentiary of the Cuban republic, and took charge of the well-known Junta in the United States, which purchased arms, organized filibustering expeditions, and otherwise aided the army in the field. In 1901 Palma was almost unanimously elected president of the republic, and on 1902, May 20, was inaugurated, the United States on that day turning over to the new government the administration of the internal affairs of the nation. Palma proved very efficient in his administration, and on 1905, Sept. 23, was again elected to the office of president. He resigned the presidency 1906, Sept. 28. See Cuba—*History.*

PALMARY, a. *păl mărĭ* [L. *palmarius*, pertaining to palms (see under Palm 2)]: pertaining to a palm; worthy of the palm, as evidence of superiority or success, as in Palmary instance, a pre-eminent instance, in allusion to the use of palm-branches in ancient times as symbols and evidence of superiority or success, the Romans giving the victorious gladiator a branch of the palm-tree. Palmary truth, a pre-eminent or victorious truth.

PALMAS, *păl'mas* or *pâl'mas*, Cape: high point of land, marked with a light-house, the southern extremity of Liberia, on west coast of Africa; lat. 4° 22′ n., long. 7° 44′ w. The name is applied also to that region which, under the appellation Maryland, is one of the states of the Liberian republic. Colored emigrants were sent there 1834 by the Md. Colonization Soc. The American Prot. Episc. Church supports a missionary bp. of Cape Palmas and parts adjacent.

PALMATIFID, a. *păl-măt'ĭ-fĭd* [L. *palma*, the palm of the hand; *findo*, I cleave, *fĭdĭ*, I have cleft]: in *bot.*, applied to a leaf divided so as to resemble a hand—the divisions extending about half-way toward the base.

PALMATIPARTITE, a. *păl'măt-ĭ-pâr'tīt* [L. *palmātus*, marked with the palm of a hand; *partītus*, divided]: in *bot.*, applied to a simple leaf having the sub-divisions extending considerably more than half-way to the base.

PALMBLAD, *pâm'blâd*, Vilhelm Frederick: Swedish writer of considerable merit, and one of the earliest and most zealous promoters of the literature of his native country: 1788-1852; b. Liljested, in East Gotland, where his father held a post under govt. While a student at Upsala, Palmblad purchased, 1810, the university printing-press, and immediately entered on the publication of several literary and scientific periodicals, the first in Swedish. These contributed materially to the diffusion of general information and to the creation of a public taste for learning. Palmblad and his associates aimed through these journals to supplant the pseudo-classical school of literature in favor of the romantic style, and to counteract the false French taste which under Gustavus III. had been universally followed in Swedish literature and art. Palmblad successively occupied the chairs of history and geography and of Greek literature in the Univ. of Upsala. His works were numerous; and besides those purely instructive were some good novels. Palmblad was editor of the great Swedish biography (Stock. 1835-52); and was an active contributor to various German works of celebrity, as Ersch and Grüber's *Allgemeine Encyklopädie*, the *Conversations-Lexikon*, etc.

PALMELLACEÆ, *păl-mĕl-lā'sē-ē:* family or group of *Algæ*, of order or sub-order *Confervaceæ*. In organization, they are among the lowest of plants; they are, however, universally regarded as vegetable, and do not, like the *Diatomaceæ*, occupy a somewhat doubtful position between the animal and vegetable kingdoms. The Palmellaceæ all grow on damp surfaces, but some under the influence of fresh water, and some of salt. Some appear as a mere powdery layer, the granules of which have little adherence to each other, as Red Snow (q.v.); some assume the form of a slimy film or gelatinous mass, as Gory Dew (q.v.); and some are more firm and membranous, with something of the character of a frond. The Palmellaceæ bear so great a resemblance to the early stages of plants higher in organization that doubts are entertained of their right to a distinct place in the botanical system, particularly as their mode of reproduction is not yet well understood. Conjugation has been observed in some of them. They propagate with great rapidity by gemmation or something like it, some sending forth tubular filaments from their cells, the extremities of which dilate into new cells, after which the connecting tube closes and ceases to exist; while in others the multiplication of cells takes place by division or segmentation (see Monad), and the young plants exhibit remarkable powers of motion for a short time, like zoospores, being furnished with vibratile cilia, by which their motion is produced. Ere long, however, their motion ceases, and the process of segmentation is ready to begin anew. The motile organs and powers of some of the Palmellaceæ, in the earlier part of their existence, have led to their being mistaken for animalcules.

PALMER, *pâ'mėr:* Mass., town, Hampden County; on the Chicopee, Swift and Ware rivers, and on the Boston & A., and Central V. R.R.'s; 14 miles east of Springfield. It includes the villages of Palmer, Three Rivers, Bondsville, Thorndike, and Duckville, of which the first two are the most important. It was first settled in 1716 by John Kingston, and was incorporated as a town in 1775; for several years previous to its incorporation (1741-52) it was called Kingston. It is an enterprising industrial town and manufactures cotton and woolen goods, carpets, wire, wire nails, hats, etc. It has a public and an association library. Pop. (1910) 8,610.

PALMER, *pâ'mėr* [Lat. *palmifer*, palm-bearer]: term denoting one of those numerous classes of PILGRIMS (q.v.) whose origin and history are interesting studies in the social life of medieval Europe. The Palmer, properly so called, was a pilgrim who *had performed* the pilgrimage to the HOLY SEPULCHRE (q.v.), and had returned or was returning home after the fulfilment of his vow. The palmers were so called from their carrying branches of the oriental palm, in token of their accomplished expedition. On arriving at their home, they repaired to the church to return thanks to God, and offered the palm to the priest, to be placed upon the altar. The palms so offered were frequently used in the procession of Palm Sunday. Even after the time of his return, the religious character of the Palmer continued; and though his office might be supposed to have ceased with the fulfilment of his vow, many palmers continued their religious peregrinations even in their native country. They were thus—as distinct from *pilgrims*—a class of itinerant monks, without fixed residence, professing voluntary poverty, observing celibacy, and devoted to visiting at stated times the most remarkable SANCTUARIES (q.v.) of the several countries of the West. Their costume was commonly the same as that of the ordinary PILGRIM (q.v.), though modified in different countries.

PALMER, *pâ'mėr*, ALICE ELVIRA (FREEMAN), PH.D., L.H.D., LL.D.: b. Colesville, N. Y., 1855, Feb. 21; d. Paris, France, 1902, Dec. 6. At the age of 17 she entered the Univ. of Michigan, graduating with honor 1876. She taught for a year at Geneva Lake, Wis., and during the two succeeding years was principal of the university preparatory school at East Saginaw, Mich.; was prof. of history in Wellesley College, Mass., 1879-81, acting pres. of Wellesley College 1881, and pres. 1882-87, Dec. 22. She was married 1887, Dec. 23, to Prof. George Herbert Palmer, of Harvard Univ., and traveled in Europe 1888, June—1889, Sept. She received the degree of PH.D. from the Univ. of Michigan 1882, that of doctor of letters from Columbia College 1887, and that of LL.D. from Union University in 1895. She delivered many addresses on educational subjects; was a member of numerous educational committees, societies, and boards of schools for girls; a trustee of Wellesley College; pres-

ident of the Collegiate Alumnæ Association; in 1892-95 was dean of the Woman's Department of the Univ. of Chicago.

PALMER, Anthony: American colonial governor: b. England about 1675; d. Philadelphia, Pa., 1749, May. He was a merchant in Barbados for some time, but in 1707 purchased a large tract of land in Philadelphia where he then settled. In 1708 he was a member of the provincial council and served until his death. When Lieutenant-Governor George Thomas resigned in 1747 the government devolved upon Palmer, who was president of the executive council, and during the succeeding 18 months he administered the affairs of the colony with much ability. He conciliated the Indians and took precautions for the military defense of the colony against Spain and France, though opposed by the Quaker members of the council. The 'Kensington District' of Philadelphia was originally a portion of his farm.

PALMER, Sir Charles Mark: English ironmaster and shipbuilder: b. South Shields, 1822, Nov. 3; d. London, 1907, June 4. He was educated for a commercial career in France; worked with his father, a shipbuilder; was partner in several coal companies; reformed the coal-carrying trade from the north of England by building screw colliers (1852), which drove the sailing brigs out of business; and at Jarrow established a great shipyard. Both iron and coal for this yard are supplied by Palmer's own mines. He introduced the use of rolled iron plates for men-of-war, held several important government contracts, was elected to the House of Commons in 1874, and was a member till his death. He was made a baronet in 1886.

PALMER, Edward Henry: Oriental scholar: 1840, Aug. 7—1882, Aug. 11; b. Cambridge, England. After attending school he was a clerk at London, but showed remarkable talent for acquiring languages. In 1860 he turned to oriental studies, entered St. John's College, Cambridge, taking his degree A.M. 1870. He went with the expedition for the survey of Sinai 1868, and was exploring the South Country 1869. Palmer was prof. of Arabic in Cambridge Univ. 1871-81, and went to the East 1882, at the request of the government, to aid the English by his knowledge of the language and his influence with the Arabs, in the war with Egypt. While on a mission in the desert, he was with two companions captured, and, by order of the government of the province, put to death. Among his works are: *The Negeb, or South Country of Scripture* (1871); *The Desert of the Exodus* (1871); a *Persian-English and English-Persian Dictionary* (1875); and numerous brilliant translations from the Persian and other Eastern languages.

PALM'ER, Erastus Dow: sculptor: b. Pompey, N. Y., 1817, Apr. 2; d. Albany, N. Y., 1904, March 9. When a boy, he learned the carpenter's trade, which he followed

till 1846, when he was so successful in cutting a portrait of his wife on a shell that he gave his time for two years to cutting cameos. He then engaged in sculpture. His first work in this direction was *The Infant Ceres*, which gave him considerable fame at its public exhibition 1850. After that date, he cut a large number of figures in marble, including portrait busts of Alexander Hamilton, Com. M. C. Perry, Gov. E. D. Morgan, and other prominent men; numerous mythological characters; a representation of the *Landing of the Pilgrims;* and a statue of Robert R. Livingston, which received a prize at the Centennial Exhibition.

PALMER, Frederick: American journalist: b. Pleasantville, Pa., 1873, Jan. 29. He was educated at Allegheny College, Meadville, Pa., and was a London newspaper correspondent 1895-7, during the Greek war, 1897, and from the Klondike and Philippines 1897-8. In 1903 he was in Central America and reported also the Macedonian insurrection, and in 1904-5 was with the Japanese army for *Collier's Weekly* and the London *Times*. He has published *Going to War in Greece* (1897); *In the Klondike* (1899); *The Ways of the Service* (1901); *The Vagabond*, a novel (1903); *With Kuroki in Manchuria* (1904); *Lucy of the Stars* (1906); etc.

PALMER, George Herbert, ll.d., litt.d.: American educator and classical scholar: b. Boston, 1842, March 19. He was graduated from Harvard in 1864, studied at the University of Tübingen 1867-9, and at Andover Theological Seminary in 1870; and after serving as an assistant professor at Harvard 1873-83, and professor of Philosophy 1883-9, became Alford professor of natural religion there in 1889, which position he still holds. He has published a rhythmic prose translation of the Odyssey (1891); *The New Education* (1887); *The Glory of the Imperfect* (1898); *Self Cultivation in English* (1897); *The Antigone of Sophocles*, a translation (1899) *The Field of Ethics* (1901); *The Nature of Goodness* (1904); *The Life and Works of George Herbert* (3 vols. 1905); etc.

PALM'ER, James Shedden: 1810-1867, Dec. 7; b. New Jersey. At the age of 15 he joined the navy as a midshipman; was in several battles at Sumatra 1838; commanded one of the schooners of the blockading force in the Mexican war; at the opening of the civil war was with the Mediterranean squadron, but was soon called to join the blockading fleet on the south Atlantic coast; was prominent at the battle of Vicksburg, and won the warm friendship of Admiral Farragut for gallantry in that action; was flag capt. of Farragut's force at New Orleans and Mobile, and was appointed to the command of one of the Atlantic squadrons 1865. He was promoted lieutenant 1836, commander 1855, captain 1862, commodore 1863, and rear-admiral 1866. He died at St. Thomas, W. I., of yellow fever.

PALM'ER, John McCauley: b. Eagle Creek, Ky., 1817, Sept. 13; d. Springfield, Ill., 1900, Sept. 25. He

commenced practicing law at Carlinville, Ill., 1840; was a member of the constitutional convention of the state 1847, and of the state senate 1852-54; was one of the founders of the republican party, a delegate to the national convention of the party 1856, and a presidential elector 1860; and a member of the peace convention at Washington 1861. On the opening of the war he promptly entered the Union army, and by a unanimous vote was chosen colonel of the 14th Ill. infantry. He went with Gen. Fremont to north Missouri 1861, in 1862 aided Gen. Pope in the battles at New Madrid and Island No. 10, and in the latter engagement, and subsequently at the battle of Stone River, rendered brilliant service. He was also in the battle of Chickamauga, commanded a corps in the Atlanta campaign, and was afterward assigned to the department of Kentucky. He was promoted brigadier-general volunteers 1861 and major-general volunteers 1862; was governor of Illinois 1869-73; was unsuccessful as democratic candidate for governor 1888, also for the U. S. senate 1889, Jan. 23, and as nominee of the National Democratic party for president of the U. S. 1897, his popular vote being 133,148. He served in the U. S. senate 1891-97; was candidate of the Gold Democrats for president 1896.

PALMER, John Williamson: American author: b. Baltimore, Md., 1825, April 4; d. there 1906, Feb. 26. He was graduated from the University of Maryland as a physician in 1847; was city physician in Baltimore 1849-50, and subsequently was connected with the staff of the Century and Standard dictionaries. Among his publications are: *The Golden Dragon: or, Up and Down the Irrawaddi* (1853); *The New and the Old: or, California and India in Romantic Aspects* (1859); *After His Kind*, a novel (1886); *The Poetry of Compliment and Courtship* (1867); *For Charlie's Sake and Other Lyrics and Ballads* (1901); and *Stonewall Jackson's Way*, one of the most popular ballads of the Civil War.

PALMER, Nathaniel Brown: American sea-captain: b. Stonington, Conn., 1799; d. 1877. He went to sea at 14 and in 1821 he commanded the sloop Hero which set sail from Yankee Harbor in South Shetlands on an exploring expedition. He discovered the land known as the Palmer Archipelago, which at the time was supposed to be a portion of the Antarctic continent. He followed a seafaring life until 1849 and was afterward a director of the Fall River line of steamers.

PALM'ER, Ray, d.d.: 1808, Nov. 12—1887, Mar. 29; b. Little Compton, R. I. He graduated from Yale 1830, taught school in New York and New Haven, and was pastor of a Congl. church, Bath, Me., 1835-50. In the latter year he became pastor of the First Congregational Church in Albany, N. Y., with which he remained till 1866, when he accepted the office of secretary of the American Congregational Union, which he held 12 years. He wrote several valuable works, but is most widely

known by his hymns, several of which are among the most widely popular of American sacred lyrical productions. Of these, *My Faith Looks Up to Thee* appeared in more than 20 languages. Among his numerous books are *Remember Me* (1855, 2d ed. 1873); *Hymns of My Holy Hours* (1866); *Home, or the Unlost Paradise* (1868); *Complete Poetical Works* (1876); and *Voices of Hope and Gladness* (1880). In his later years he resided in Newark, N. J., where he died.

PALM'ER, Roundell (Lord Selborne), D.C.L.: born Mixbury, England, 1812, Nov. 27: d. 1895, May 4. He graduated with high honors from Trinity College, Oxford, 1834; was a fellow at Magdalen College, studied law, and commenced practice 1837. He became a member of parliament 1847, was defeated 1852, and was again a member 1853-57. In 1849 he was appointed queen's counsel, became solicitor-gen. 1861, and in the same year was knighted and returned to parliament. He was attorney-general 1863-66, and 1868 was offered by Mr. Gladstone the position of chancellor, which he declined because he was not in harmony with the administration on the question of cutting off the endowments of the Irish Church. At the consideration of the 'Alabama Claims' by the arbitration commission at Geneva 1871-2, he was counsel for the British government; was raised to the peerage 1872, with the title of Baron Selborne of Selborne, and became lord chancellor, which office he held till 1874, Feb. He was elected 1877 lord rector of St. Andrews Univ., and, though holding different views on the Irish land question from other members of the cabinet, again became lord chancellor 1880, and retained the office till 1885. He declined to become a member of the cabinet 1886, and for several years was a member of the liberal unionist party. He strongly advocated the formation of a great law university in London. He edited *The Book of Praise from the Best English Hymn-Writers* (1862); and published: *Notes on Some Passages in the Liturgical History of the Reformed English Church* (1878); *The Case against Disestablishment* (1886); and *Churches and Tithes* (1887).

PALMER, Samuel: English painter: b. Newington, Lancashire, 1805, Jan. 27: d. Reidgate, Kent, 1881, May 24. He was a pupil in the antique school of the British Museum, and received some inspiration from his acquaintance with William Blake. His studies were for two years continued at Rome (1837-9) after which he devoted himself to water colors and became a member of the Water Color Society in 1854. While belonging to the ideal school of Turner and Wilson he confined himself entirely to water color and etching, in both of which departments he reached the highest excellence. Among his best-known pictures which are suffused with profound poetic feeling are: *Dream on the Apenines* (1864); *Curfew* (1870); and *The Waters Murmuring* (1877).

His finest etchings include: *The Sleeping Shepherd; The Skylark; The Lonely Tower.* He translated the eclogues of Virgil and intended to illustrate them, but only lived long enough to complete one plate, *The Opening of the Fold.*

PALMER, Walter Launt: American painter: b. Albany, N. Y., 1854, Aug. 1. After studying under F. S. Church at Hudson, N. Y., he became the pupil of Carolus Duran at Paris and developed great skill in landscape painting. He was awarded a gold medal at the World's Columbian Exposition in 1893 and honorable mention at the Paris Exposition of 1900. His Venetian scenes and snowy landscapes are remarkably effective and among his best productions are *Venice* (1882); *January* (1887); *Domes of La Salute; End of a Winter Day;* and *Under the Pines* (1896). He is a member of the National Academy and of the Society of American Artists.

PALMERSTON, *pâ'mėr-ston* (Henry John Temple), Viscount: English statesman: 1784, Oct. 20—1865, Oct. 18; b. at the family mansion, Broadlands, near Romsey, Hants. The Temples are of Saxon origin, and the family claim descent from Edwyn, who was deprived of the earldom of Mercia by the Conqueror, and lost his life in defending himself against the Normans 1071. Sir William Temple, diplomatist and patron of Swift, was of this family, which removed to Ireland in the time of Elizabeth. The family was ennobled 1722, when Henry Temple was created a peer of Ireland, with the dignities of Baron Temple and Viscount P. His grandson, second viscount, father of the famous peer, superintended his son's education at Broadlands, and then sent him to Harrow. Young Palmerston afterward went to the Univ. of Edinburgh; and matriculated at St. John's College, Cambridge, whence he was summoned to the death-bed of his father, on whose decease, 1805, Palmerston succeeded to the title. His eminent abilities were early recognized, for he was scarcely of age when the tory party in the univ. selected him (1806) as their candidate to succeed Mr. Pitt in the representation. The Marquis of Lansdowne was the whig candidate; and Lord Byron, then at Cambridge, evinces in his *Hours of Idleness* his interest in the election. Palmerston was unsuccessful, and again in 1807. He entered parliament, however, in the same year for the borough of Newtown, Isle of Wight, his colleague being Arthur Wellesley, then chief secretary of Ireland. In 1811 he exchanged Newtown for the Univ. of Cambridge, and had the distinction of representing his *alma mater* 20 years, losing his seat only when he became a member of the Grey administration, and supported the Reform Bill. For the last two years of the unreformed parliament, he sat for the now extinct borough of Bletchingly. At the first election after the Reform Act, he was returned for S. Hampshire, but lost his seat at the general election 1835. He immediately afterward found a seat for Tiverton, which he promised

never to leave as long as the electors would permit him to represent them.

Turning to his official career, we find P. beginning public life as a member of the tory party, and as sec. at war in the Duke of Portland's administration 1809. This office he held during the successive governments of Perceval, the Earl of Liverpool, Canning, Lord Goderich, and the Duke of Wellington—1809–28. The British military system swarmed with abuses, and the labor thrown upon the sec. at war during the Peninsular campaigns was prodigious. In 1817 an attempt was made to assassinate P. by an insane army-lieut. named Davis, who fired a pistol at him as he was entering the horse guards, inflicting, however, only a slight wound. P. early attached himself to the Canning section of the Liverpool administration, and accepted a seat in the cabinet of Mr. Canning. His official connection with the tory party ceased 1828, when the 'great Duke' insisted on accepting Mr. Huskisson's resignation, which was followed by P.'s retirement. The duke's govt. was swept away in the reform flood of 1830; and Earl Grey, who became prime minister, offered the seals of the foreign office to Palmerston. The European horizon was so disturbed at this crisis that a great political authority declared that if an angel from heaven were in the foreign office, he could not preserve peace three months. P. falsified the prediction. Louis Philippe then filled the throne of France; and for the first time on record, England and France acted in concert and without jealousy, under P.'s foreign ministry. He led in effecting the independence of Belgium, and in establishing the thrones of Queen Isabella of Spain and Queen Maria of Portugal on a constitutional basis. In 1841 P. went out of office with the whigs on the question of free trade in grain; but on their return 1846, he resumed the seals of the foreign office. His second foreign administration furnished various subjects of hostile party criticism, among which were the civil war in Switzerland, the Spanish marriages, the European revolutions in 1848, the rupture of diplomatic relations between Spain and Great Britain, and, finally, the affair of Don Pacifico and the quarrel with Greece. A vote of censure on the foreign policy of the govt. was, 1850, carried in the house of lords on motion of Lord Stanley (afterward Earl of Derby). A counter-resolution, approving the foreign policy of the govt., was thereupon moved by Mr. Roebuck in the lower house. The debate lasted four nights. In a speech of five hours' duration—'that speech,' said Sir Robert Peel, 'which made us all so proud of him'—P. entered on a dignified vindication of his foreign policy; and Mr. Roebuck's motion was carried by a majority of 46. 1851, Dec., the public were startled at the news that P. was no longer a member of the Russell cabinet. He had expressed his approbation of the *coup-d'état* of Louis Napoleon, without consulting either the premier or the queen; and as explanations were refused, her majesty exercised her

constitutional right of dismissing her minister. P. avenged himself, as soon as parliament met, by shattering the Russell administration to pieces on a comparatively trifling question regarding the militia. He refused an offer from the Earl of Derby to join the govt. which he was commissioned to form, but accepted the post of home sec. in the coalition administration of the Earl of Aberdeen 1852. The fall of this govt., on Mr. Roebuck's motion for a Sebastopol committee, placed P. in his 71st year in the position of prime minister, to which he was unanimously called by the voice of the nation. He vigorously prosecuted the Russian war until Sebastopol was taken and peace was made. His govt. was defeated 1857, Mar., on Mr. Cobden's motion condemnatory of the Chinese war. Parliament was dissolved, and P. met the house of commons with a large majority. But his administration fell 1858, Feb., on the Conspiracy Bill, intended to protect the French emperor against the machinations of plotting refugees. A short conservative administration followed; but 1859, June, P. was again called to the post of first lord of the treasury, which he filled till his death. It was his ambition to be considered the minister of a nation rather than the minister of a political party; and his opponents have been constrained to admit that he held office with more general acceptance than any English minister since the time of the great Lord Chatham. As an orator, he was usually homely and unpretending, but always sensible and practical. He was a dexterous tactician, and a ready, witty, and often brilliant debater. He was popular as a minister, because he was thoroughly English in his ends and aims—a statesman of the traditional aristocratic type, liberal, but far from radical. His political opinions were like those of Pitt. Even his robust health, manly bearing, and physical vigor were elements of his popularity, because they were regarded as a glorification of the English sports, which he was never ashamed to patronize. He desired nothing so ardently as to promote the wealth and grandeur of Great Britain, and his national character and national spirit, finding sometimes imperious utterance, were thoroughly appreciated by his countrymen; though the leaders of even his own party are thought to have largely disapproved of hisstrong expressions as undiplomatic, and of his artifices as too deep for sincerity, yet too shallow for success. He married, 1839, the widow of the fifth Earl of Cowper, daughter of the first Viscount Melbourne. As he died without issue, and his only brother died unmarried, the title became extinct at P.'s decease. See *Life of P.*, by Sir Henry Lytton Bulwer (Lord Dalling), continued by Evelyn Ashley.

PALM'ER-WORM: name given to many large kinds of grub, larvæ of coleopterous insects, destructive to vegetable substances of various kinds. The name is supposed to have been given from their wandering about like a palmer or pilgrim. It is used in the English version of the Old Test. as the translation of the Hebrew *gazam*, rendered *kampe* by the Septuagint, which modern Hebrew writers and others generally regard as a kind of locust, though more probably it is either the grub of a coleopterous, or the caterpillar of a lepidopterous, insect.—See Kitto, in *Pictorial Bible*, on Joel i. 4.—*Palmer-flies* are much used by anglers on English streams, and are at certain seasons excellent lures for trout, etc.

PALMETTO, n. *păl-mĕt'tō* [dim. of the L. *palma*, a. palm: Sp. *palmito*, the palmetto], (*Sabal palmetto* or *Chamærops palmetto*): name of several varieties of fan-palm, in different genera. One that may be called typical is the *cabbage-palmetto*, native of s.e. maritime parts of N. America, as far n. as lat. 35°—further n. than any other Amer. species of palm is found. It attains a height of 40–50 ft., and has a crown of large palmated leaves, the blade from one ft. to five ft. in length and breadth, and the foot-stalk long. The flowers are small, greenish, and in long racemes; the fruit black, about as long as a pea-pod, and uneatable. The leaves are made into hats. The terminal bud or *cabbage* is eaten, whence the name CABBAGE PALM (q.v.). The wood is extremely porous; but is preferred to other wood in N. America for wharves, as it is very durable, and not liable to be attacked by worms.—The P. is part of the device on the state flag and seal of S. C.—The hemp-palm, *Chamærops* (q.v.) *humilis*, of s. Europe, also is called Palmetto.—*Palmetto Fibre* is a material for bagging obtained from the saw palmetto-tree, *Sabal serrulata*, which grows plentifully in the states bordering the Gulf of Mexico. About 1888, the cotton-planters of the south, as a measure of defense against the trust which monopolized the jute bagging used for covering the cotton bales, began to make a bagging of fibre obtained from the 'straw' or leaves of the yellow or long-leaved pine (*Pinus australis*), also from stalks of the cotton-plant. P. fibre is a more recent substitute for jute. It is claimed that 2 tons of the green plant yield 1 ton of dry leaves and stems, from which can be obtained $25 worth of tannic acid and $15 worth of bagging fibre, besides $4 worth of refuse suitable for paper stock. P. fibre is asserted to be 20 per cent. stronger than jute fibre.

PALMET'TO-LEAVES: leaves of the Palmyra (q.v.) palm, *Borassus flabelliformis*, which grows extensively in India and Polynesia. The leaves have great value as material for manufacture of hats, mats, etc., and are frequently exported to western lands. In their native country, they are used as thatch, and for a great variety of other useful applications.

PALMI, *pâl′mē*, or PALME, *pâl′mā:* royal city of s. Italy, province of Reggio-Calabria, 20 m. n.n.e. of Reggio, on the coast of the Bay of Gioja. The town, through its port, carries on active trade. Pop. 10,500.

PALMIFEROUS, a. *păl-mĭf′ėr-ŭs* [L. *palma*, a palm; *fero*, I bear]: bearing palms.

PALMIPED, a. *păl′mĭ-pĕd* [L. *palma*, a palm; *pedes*, feet]: web-footed: N. a web-footed or swimming animal. PAL′MIPEDS, n. plu. *-pĕdz*, or PALMIPIDES, n. plu. *păl-mĭp′ĭ-dēz*, order of swimming-birds, called also WEB-FOOTED BIRDS or NATATORES or SWIMMERS; the *Anseres* of Linnæus; a natural order universally recognized by ornithologists, having the feet formed specially for swimming, and the toes *webbed*, i.e., connected by a membrane, at least those which are directed forward. In swimming, the feet are contracted when drawn forward, the toes being brought together, and expanded to their utmost extent in the backward stroke. In accordance with their aquatic habits, the P. are further characterized by a boat-like form, adapted to move through the water with little resistance; and by a dense and polished plumage, oiled by a secretion from certain glands near the tail, very impervious to water; while warmth is further secured by a clothing of down more or less abundant beneath the feathers. They are remarkable for length of breast-bone (*sternum*), and the neck is often longer than the legs, a thing very unusual in birds, so that they can plunge the head far down in search of food. The length of the wings differs very much in different sections of the order, and with it the power of flying; as does also the power of diving, which some possess in high degree, and others, even of the same family, to a very small degree. To this order belong geese, swans, ducks, divers, auks, guillemots, puffins, penguins, petrels, albatrosses, gulls, terns, shearwaters, noddies, pelicans, cormorants, frigate-birds, gannets, darters, tropic-birds, etc. (See these titles.)

PALMISTRY, n. *păl'mĭs-trĭ* [L. *palma*, the palm of the hand]: the pretended art of telling fortunes by examining the lines and marks in the palms of the hands (see CHIROMANCY). PAL'MISTER, n. *-tẽr*, one who pretends to tell fortunes by examining the palms.

PALMITIC ACID, *păl-mĭt'ĭk ăs'ĭd* ($C_{16}H_{32}O_2$): one of the *fatty acids*. It occurs in many natural fats as a glyceride (*tripalmitin*), often associated with stearin. Palm oil, Chinese tallow (the product of the tallow-tree, *Stillingia sebifera*), and Japan wax (from *Rhus succedanea*) are mainly tripalmitin. Palmitic acid is a colorless solid lighter than water. It is easily prepared by saponifying palm oil with caustic potash, decomposing the soap with sulphuric acid, and crystallizing the separated fatty acid several times from hot alcohol, till it exhibits a constant melting-point. Chinese tallow may be saponified with alcoholic potash, and Japan wax by fusion with solid potassium hydrate, and the soap treated in similar manner.

PALMITIN, n. *păl'mĭ-tĭn* [from the *oil palm:* It. *palmeto;* L. *palmētum*, a palm-grove]: a fatty substance occurring quite commonly in the natural fats and organic oils, and closely analogous to stearin in its chemical structure and deportment. It is especially abundant in palm oil, from which circumstance it derives its name. Tri-palmitin may be conveniently prepared from palm oil by expelling the liquid portion by pressure, washing the solid residue with boiling alcohol to remove such other fats as it may still retain, and finally crystallizing from a solution in ether. By this process it is obtained in the form of white crystals which are scarcely soluble in alcohol but readily soluble in ether, and which melt at 144° F. Varieties of tri-palmitin are said to exist, however, which melt at 115° F. Chemically, tri-palmitin is a compound of palmitic acid, $C_{15}H_{31}.COOH$, with glycerin, $C_3H_5(OH)_3$; three molecules of the acid being combined with one of the glycerin, as indicated by the equation $3C_{15}H_{31}.COOH + C_3H_5(OH)_3 = 3H_2O + C_3H_5(C_{15}H_{31}.COO)_3$, the last formula on the right hand side of the equality sign being that of tri-palmitin. Two other compounds of palmitic acid with glycerin are also known, but they are of less importance. Mono-palmitin has the formula $C_3H_5(OH)_2(C_{15}H_{31}.COO)$, and melts at about 140° F. It may be distilled in a vacuum, but when heated in the air it breaks up with the formation of acroleïn and other products. Di-palmitin has the formula $C_3H_5(OH)(C_{15}H_{31}.COO)_2$, and its melting point is given, by various authorities, at from 125° F. to 140° F. When a mixture of glycerin and palmitic acid is heated for 24 hours at 400° F., all three of the palmitins are formed; and when the product is shaken with lime water and then extracted with ether, and the ethereal solution is evaporated, tri-palmitin, di-palmitin, and mono-palmitin separate out in the order named.

PALM SUNDAY (Lat. *Dominica Palmarum* or *Dom. in Palmis*): last Sunday of Lent, called from the custom of blessing branches of the palm-tree, or of other trees in countries where palm cannot be procured, and of carrying the blessed branches in procession, in commemoration of the triumphal entry of the Lord Jesus into Jerusalem (Jn. xii.). The date of the origin of this custom is uncertain. The first writer in the West who expressly refers to it is Venerable Bede. The usage existed certainly in the 7th c. A special service is found in the Roman missal, also in the Greek euchologies, for the blessing of 'branches of palms and olives;' but in many countries, other trees instead are blessed, as in England the yew or the willow, and in Brittany and in parts of the United States the box. A procession is formed, the members of which issue from the church carrying branches in their hands, singing a hymn suited to the occasion, of very ancient origin. In the Greek Church, the book of the Gospels is borne in front. In some Rom. Cath. countries of the West, a priest, or, occasionally, a lay figure, was led at the head, mounted upon an ass, in commemoration of Christ's entry into the city—still a usage in Spain and Spanish America. Before their return to the church, the doors have been closed, and certain strophes of the hymn are sung alternately by a choir within the church and by the procession without, when, on the subdeacon's knocking at the door, it is again thrown open, and the procession re-enters. During the singing of the Passion in the solemn mass which ensues, the congregation hold the palm branches in their hands, and at the conclusion of the service the branches are carried to their respective homes, where they are preserved during the year. At Rome, the procession of the palms, in which the pope is carried, is among the most striking of the picturesque ceremonies of the Holy Week. In England, Palm Sunday anciently was celebrated with much ceremonial; but the blessing and procession of the palms was discontinued in the Church of England, with the other ceremonies abolished in the reign of Edward VI.

PALMY DAYS, *pâm'i dāz* [see PALM 2 and PALMARY]: prosperous and happy days, in which victory and success were always achieved.

PALMYRA, *păl-mī'ra:* name given by the Greeks to a great and splendid ancient city of upper Syria. Its original Hebrew name was *Tadmor*, which, like the Greek word, means 'city of palms.' It was built, according to the writers of Kings (IK. ix. 18) and Chronicles (II Chron. viii. 4), by Solomon, B.C. 10th c.; but it is more probable that he only enlarged it. It occupied a fertile oasis, well watered, and abounding in palm-trees. Barren and naked mountains overlook it from the w., and to the e. and s. stretches the illimitable sandy desert. P. was, in the Solomonic age, a bulwark of the Hebrew kingdom against the wandering hordes of

Bedouins; but its early history is obscure and insignificant. After the fall of Seleucia, it became a great centre of commercial intercourse between e. and w. Asia. Its commercial importance, wealth, and magnificence greatly increased after the time of Trajan, who subjected the whole country to the Roman empire. In the 3d c., Odenathus, a Syrian, founded here an empire, which, after his murder, rose to great prosperity under his wife, Zenobia (q.v.), and included both Syria and Mesopotamia; but this was not of long duration, for the Roman emperor Aurelian conquered it 275, and the city was soon after almost entirely destroyed in revenge for the slaughter of a Roman garrison. It never recovered from this blow, although Justinian fortified it anew. The Saracens destroyed it 744. A village called Tedmor, inhabited by a few Arab families, now occupies the site. The ruins of the ancient city, white and dazzling in the Syrian sun, excite at a little distance the admiration of all beholders; but when examined in detail, they are said to be far from imposing, though as to this opinions differ. They were visited by English merchants resident at Aleppo 1691, again by Wood and Dawkins 1751, and since then by a great number of travellers. The ruins of a temple of Baal, the sun god, are confessedly magnificent. The language of ancient Palmyrene appears, from inscriptions which remain, to have been an Aramaic language. See Murray's or Baedeker's *Handbook for Syria and Palestine;* Vogüé's *Syrie Centrale.*

PALMYRA, or PALMYRA PALM, *păl-mī'rā* [*Palmyra*, an ancient town of Syria, on the borders of the Arabian desert], (*Cocos nucĭfĕra* and *Borassus flabel'liform'is*, ord. *Palmaceæ*): species of palm with a magnificent crown of fan-shaped leaves; native of the E. Indies. The stem attains a height of 25–40 or even 60 ft., and tapers slightly upward. The leaves are about four ft. long, with stalks about the same length, the stalks spiny at the edges; each leaf having 70–80 rays. The fruit is somewhat triangular, about the size of a child's head; having a thick, fibrous, and rather succulent yellowish-brown or glossy black rind, and containing three seeds each as large as a goose's egg. The P. is the most common palm of India, growing spontaneously in many districts, cultivated in others, and reaching as far n. as lat. 30°. It is of slow growth; and the wood near the circumference of the stem in old trees is very hard, black, heavy, durable, susceptible of high polish, and valuable, easily divided in a longitudinal direction, but very difficult to cut across. The P. abounds greatly in n. Ceylon, forming extensive forests; and the timber is exported to the opposite coast of India, being of superior quality to that produced there. It is much used in house-building. The stalks of the leaves are used for making fences, etc. The leaves are used for thatching houses; for making baskets, mats, hats, umbrellas, and large fans; and for writing upon. Their fibres are employed for making twine and small rope; they are about

two ft. long, and very wiry. A fine down found at the base of the leaf-stalks is used for straining liquids and for stanching wounds. The P. yields palm-wine, and of course also arrack and sugar (*jaggery*). It furnishes great part of the palm-wine, sugar, and arrack of India: see ARRACK. The fruit is cooked in a great variety of ways, and used for food. The seeds are jelly-like, and palatable when young. A bland fixed oil is extracted from the fruit. The young plants, a few inches high, are esteemed as a culinary vegetable, being boiled and eaten generally with a little of the kernel of the cocoa-nut; and sometimes they are dried and pounded into a kind of meal. Multitudes of the inhabitants of n. Ceylon depend almost entirely on the P. for the supply of all their wants. In the 'Palmyra regions' of the southern Dekkan, vast numbers of the people subsist chiefly on the fruit of this palm.

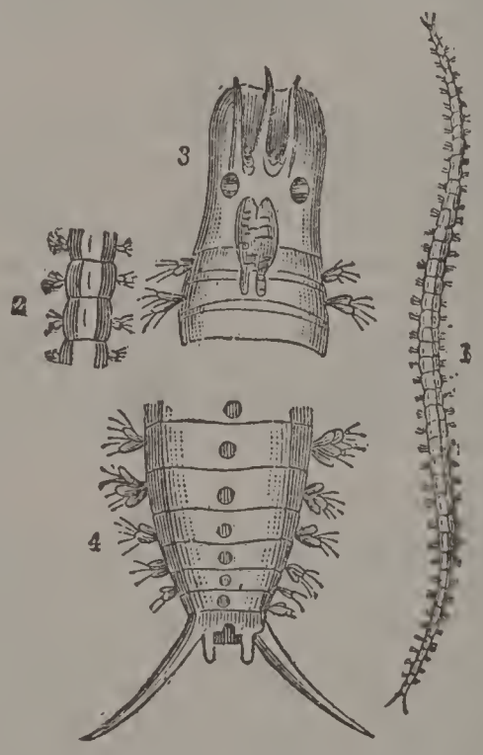
The Deleb Palm (q.v.), so important to the inhabitants of central Africa, is believed to be nearly allied to the Palmyra palm.

PALMY'RA WOOD: properly, the wood of only the Palmyra palm (*Borassus flabelliformis*); but applied generally to all kinds of palm-tree wood imported into western lands, very much of which is the wood of the cocoa-nut palm, *Cocos nucifera*, and the allied species *C. plumosa*. These woods are called also *Speckled Wood* and *Porcupine Wood* by the dealers—the former name being applied to those veneers cut transversely, and showing the ends of numerous black fibres mixed with the lighter-colored portions; and the latter to longitudinal sections, in which the mixed black and white fibres resemble porcupines' quills.

PALO ALTO, *pâ'lō âl'tō*, BATTLE OF: 1846, May 8, between U. S. and Mexican troops in s. Texas, about 9 m. from Matamoras. To protect valuable stores at Point Isabel, threatened by the Mexicans, Gen. Taylor led a U. S. force to that point, which he fortified, and May 7 commenced with about 2,300 men the return march to aid Maj. Brown, who had been left in charge of a small force and had been attacked. The following day he was intercepted by a Mexican army of 6,000 men under Gen. Arista. The Mexicans opened an artillery fire and made a cavalry charge, but did not break the advancing lines. After a conflict lasting 5 hours, the Mexicans retreated in disorder. The losses in the battle are variously stated, but were very light on both sides

PA'LO BLAN'CO (*Flotovia dicanthoides*): large tree, native of Chili, the wood of which is white, and very useful and durable. It is remarkable as one of the few large trees belonging to the nat. order *Compositæ*.

PALO'LO, or BALO'LO (*Palolo viridis*): dorsibranchiate annelid, allied to the Lug-worm, extremely abundant at certain seasons in the sea above and near the coral reefs which surround many of the South Sea Islands, e.g., the Samoa Islands and the Fiji Islands. The body is cylindrical, slightly tapering at both ends, divided into nearly equal joints, each joint with a small tuft of gills on each side. In thickness, the P. resembles a very fine straw; it is about three inches long, generally of greenish color, with a row of round black spots; but the color varies to red, brown, and white. These annelids make their appearance in great multitudes, apparently rising out of the coral reefs, and with a periodical regularity which is very remarkable. They are eagerly sought by the islanders, who are on the watch for their appearance, and go out in canoes early in the morning to take them in nets; but they often occur in such numbers that the water seems full of them and



Palolo Viridis (copied from Seemann's *Viti*):
1, the entire animal, half natural size; 2, portion of body, slightly magnified; 3, magnified figure of its head, with its three frontal tentacula and eyes; 4, posterior extremity, dorsal aspect.

they may be grasped by handfuls. The South Sea islanders are very fond of them for food. To prepare them for use, they are wrapped in bread-fruit leaves, and cooked 12 to 18 hours in an oven.

PALOS, *pâ'lōs:* town in the province of Huelva, Spain, on the Tinto river, near its entrance to the Gulf of Cadiz. It is noted as the port from which Columbus started, 1492, on the voyage in which he discovered America, and to which he returned. The convent of La Rabida, at which the great discoverer received encouragement and aid before he became famous, is still standing between the town and the ocean. Pop. about 1,175.

PALP, n. *păl̆p*, plu. PALPI, *păl′pī*, or PALPS, *păl̆ps* [L. *palpo*, I stroke or feel]: one of the feelers of an insect, attached to the head.—*Palpi* are organs occurring in Insects, Crustaceans, and Arachnidans. In Insects, one or two pair of jointed appendages bearing this name are attached to the maxillæ, while one pair is attached to the labium; and in the higher Crustaceans, similar appendages are attached to the mandibles and foot-jaws. In both these classes, the palpi probably serve, through the sense of touch, to take cognizance of the qualities of the substances employed as food. In the Arachnidans, the palpi are attached to the maxillæ only; and vary exceedingly in form and functions. In the scorpions, e.g., they are extremely developed, and terminate in pincers which resemble the chelæ (or pincers) of crabs and lobsters; while in the spiders, they terminate in a single movable claw in the female, and in the male the last joint is dilated and acts as an accessory generative organ.

PALPABLE, a. *păl′pă-bl* [F. *palpable*, that may be felt, palpable—from mid. L. *palpab′ĭlĭs*—from L. *palpo*, I stroke or touch gently: It. *palpabile—lit.*, perceptible by touch]: easily perceived and detected, as a mistake; plain; obvious; gross. PAL′PABLY, ad. *-blĭ*. PAL′PABLENESS, n. *-bl-nĕs*, or PAL′PABIL′ITY, n. *-bĭl′ĭ-tĭ*, the quality of being palpable or perceptible; obviousness; grossness. PALPATION, n. *păl-pā′shŭn*, the act of feeling; examination by the sense of touch.

PALPEBRA, n. *păl′pē-bră*, plu. PAL′PEBRÆ, *-brē* [L. *palpebra*, the eyelid]: the eyelid. PAL′PEBRAL, a. *-brăl*, pertaining to the eyelids or eyebrows.

PALPI: see PALP.

PALPIFORM, a. *păl′pĭ-fawrm* [L. *palpo*, I stroke or touch gently; *forma*, shape]: having the form of feelers.

PALPIGEROUS, a. *păl-pĭj′ĕr-ŭs* [L. *palpum*, a stroking; *gero*, I carry or bear]: bearing palpi.

PALPITATE, v. *păl′pĭ-tāt* [L. *palpĭtātus*, moved quickly and frequently—from *palpārĕ*, to stroke gently: It. *palpitare:* F. *palpiter*]: to beat violently, as the heart after an unusual amount of running or bodily exertion; to flutter, pant, or throb. PAL′PITATING, imp. PAL′PITATED, pp. PALPITATION, n. *păl′pĭ-tā′shŭn* [F.—L.] (see below).

PALPITA′TION: inordinately forcible throbbing or pulsation of the heart, frequently giving rise to a most troublesome and disagreeable sensation. P. may be either functional or a symptom of organic disease of the heart: here it is considered as merely a functional disorder. Although it may be persistent, it far more frequently comes on in paroxysms, which terminate usually within half an hour, recurring afterward quite irregularly, sometimes daily or several times a day, sometimes not till after long interval. The attack often comes on under some mental or physical excitement, but

sometimes when the patient is quite composed or even asleep. If the paroxysm is severe, the heart feels as if bounding upward into the throat; and there is a sensation of oppression over the cardiac region, with hurried or even difficult respiration. Excluding organic diseases, the causes of this affection are either (1) an abnormally excitable condition of the nerves of the heart, or (2) an unhealthy condition of the blood.

1. Among the causes of disturbed innervation may be especially noticed the abuse of tea (especially green tea), coffee, spirits, and tobacco. Any irritation of the stomach and intestinal canal may be reflected to the heart; hence palpitation may frequently be traced to flatulence, undue acidity, and intestinal worms, especially tape-worms. Everything also that causes pressure on the heart, such as tight lacing, abdominal dropsy, or an enlarged uterus, is liable to occasion this affection.

2. If the blood is abnormally rich and stimulating, it may give rise to P., as in Plethora (q.v.); but the opposite condition, known as Anæmia (q.v.), is a much more frequent cause of this affection. In anæmia the blood is watery and deficient in fibrine and (far more) in red corpuscles; and being thus in an unnatural state, it acts as an unnatural stimulant, and induces frequent, though not usually strong, pulsations. In cases of this kind, singular murmurs (not unlike those heard when we apply certain shells to the ear) are heard on applying the stethoscope to the neck, over the course of the great jugular veins.

The age at which P. usually comes on is 15 to 25 years; and the affection—especially if it arise from anæmia—is very much more frequent in the female than in the male sex.

The treatment must depend on the cause. Use of all nervous stimulants (tea, coffee, alcohol, and tobacco) should be suspended or abandoned. If the patient is clearly plethoric, with full, strong pulse, he should take saline cathartics and live on comparatively low diet (including little animal food) until this condition is removed. When, on the other hand, the P. is due to an anæmic condition, the remedies are preparations of iron, aloetic purgatives, abundance of animal food, bitter ale, the cold shower-bath, and moderate exercise.

PALSGRAVE, n. *pawlz′grāv*, fem. PALS′GRAVINE, *-grā-vĭn* [Dut. *paltsgraaf*, a count palatine: O. Dut. *pals*, a palace: L. *palātĭŭm*, a royal residence, and Ger. *graf*, a count]: a count or earl who has the superintendence of a royal palace.

PALSY, n. *pawl′zĭ* [F. *paralysie*, the palsy—from L. *paralysis*—from Gr. *paral′usis*, a loosening]: loss or diminution of sensation or of motion, or of both, in any part of an animal body: see PARALYSIS, of which word palsy is an abbreviation: V. to strike as with palsy. PAL′SYING, imp.: ADJ. affecting as with palsy. PAL′SIED, pp. *-zĭd:* ADJ. affected with palsy. PAL′SICAL, a. *-zĭ-kăl*, subject to palsy.

PALTER, v. *pawl′tėr* [Low Ger. *pladdern*, to paddle, to dabble: Dut. *pladeren;* Ger. *plaudern*, to tattle, to talk to excess: perhaps connected with Norw. *paltra*, rags]: properly, to babble; to chatter; to dodge; to act in an insincere and false manner; to trifle with; to tamper with. PAL′TERING, imp. PAL′TERED, pp. *-tėrd.* PAL′TERER, n. *-tėr-ėr*, one who acts in an insincere and false manner.

PALTRY, a. *pawl′trĭ* [Dan. *pialtet*, ragged: perhaps connected with Lith. *spalai*, trash]: sorry; mean; worthless; contemptible. PAL′TRILY, ad. *-lĭ.* PAL′TRINESS, n. *-trĭ-nĕs*, state or quality of being paltry.—SYN. of 'paltry': despicable; pitiful; vile.

PALUDAL, a. *păl-ū′dăl* [L. *palūdem*, a swamp or marsh]: pertaining to marshes or swamps. PALU′DINOUS, a. *-dĭn-ŭs*, produced in or pertaining to marshes. PALUDINA, n. *păl′ū-dī′nă*, in *geol.*, the marsh or river snail, inhabiting a top-shaped shell or whorl. PALUSTRAL, a. *păl-ŭs′trăl*, pertaining to a bog or marsh.

PALY, a. *pāl′ĭ:* OE. for PALE (q.v.).

PAM, n. *păm* [F. *pamphile*, the knave of clubs: Pol. *pamfil*, the knave of any suit]: the knave of clubs at loo.

PAMIERS, *pâ-me-ā′:* town in the dept. of Ariège, France, on the Ariège river, 40 m. s. of Toulouse. It is in a fine agricultural region, has large iron-works, flour-mills, paper-mills, and other factories, and extensive grain trade. It is the seat of a bishop, has a fine cathedral, a college, and a hospital. A medicinal spring in the vicinity is somewhat noted. The town dates from the early part of the 12th c., when a castle was built by the Count of Foix. It has been the scene of various conflicts, and been pillaged three times. Pop. about 12,000.

PAMIR, or PAMEER, *pâ-mēr′* (also aptly called *Bam-i-dunya*, 'Roof of the World'): mountainous region in central Asia, nucleus of the central Asian highland system. Hither converge the Hindu Kush, the Himalaya, the Kuen Lun, and the Tian-Shan Mts. The P. is not so much a plateau, or region of lofty plateaux, as a vast mountainous district of about 30,000 sq. m., broken into ridges and valleys. The ridges rise 6,000 to 9,000 ft. above the valleys, and the culminating points attain in some cases 25,000 ft. above sea-level.

PAMLICO, *păm′lĭ-kō*, RIVER: estuary of Tar river, in N. C. Its extent is about 40 m., and it empties into Pamlico Sound.—*Tar river* is about 180 m. long, navigable about 80 m.

PAM′LICO SOUND: on the coast of N. C., separated from the ocean by long, narrow islands of sand, an angle of the largest island forming Cape Hatteras. P. S. is connected with the ocean by several narrow inlets, and with Albemarle Sound on the n. It is 80 m. long, and 10 to 30 m. wide, and receives the Neuse and Pamlico and smaller rivers. Its shores are low.

PAMPAS, n. plu. *păm'păz* [Peruvian, *pampa*, a valley, a plain]: the vast treeless plains of S. Amer., covered with luxuriant herbage, and pastured by immense herds of wild cattle and horses.—*Pampas* in general is a designation of S. Amer. plains, in distinction from the 'prairies' of N. America. It is also used in Peru as a general designation of tracts of level land either on the coast or among the mountains: the chief P. in Peru are those of the Sacramento. But in its special and proper signification, P. denotes the immense and partly undulating plains bounded by the Rio Negro of Patagonia,

Pampas Grass (*Gynerium argenteum*).

the La Plata and Paraguay, and the base of the Cordilleras. These plains during the wet season afford abundant pasturage to the many herds of wild oxen and horses which roam over them; but they become rapidly parched under the burning heat of the sun, except in low-lying tracts or along river-banks. The most fertile of the P. lie w. toward the Cordilleras. From the rapid alternation of vigorous growth with parching drought, the growth of trees is impossible, and their place is supplied by sparse groups of stunted shrubs. The soil, in general poor, is a diluvium of sandy clay, and abounds in

the bones of extinct mammals. Strips of waterless desert, known as *travesias*, stretch across the P.; these travesias are destitute of all vegetation except a few bushes, and are markedly distinct in geological character. The soil of the P. is more or less impregnated with salt, and saltpetre abounds in many places. The wild animals are horses, oxen (both introduced by the Spaniards), nandous, and guanacos. The skins of the horses and oxen, and the flesh of the latter, are very important in the trade of this region. The half-white inhabitants are called Guachos (q.v.). The whole area of the P. has been estimated at about 1,500,000 sq. m. PAM'PAS GRASS (*Gynerium argenteum*), grass covering the S. Amer. *pampas*, and introduced from Brazil into some northern countries as an ornamental plant. It is quite hardy, and its tufts have a splendid appearance. The leaves are six or eight ft. long, the ends hanging gracefully over; the flowering stems 10 to 14 ft. high; the panicles of flowers silvery white, and 18 to 24 in. long. The herbage is too coarse to be of agricultural value. The male and female flowers are on separate plants; in panicles; the spikelets 2-flowered, one floret stalked, and the other sessile; the paleæ of the female florets elongated, awn-shaped, and woolly.—Another species of the same genus, *G. saccharoides*, also Brazilian, yields considerable sugar. PAMPEAN FORMATION, n. *păm'pē-ăn*, in *geol.*, the comparatively recent alluvial deposits overspreading the pampas of S. America.

PAMPELUNA, *pâm-pā-lō'nâ*, or PAMPLONA, *pâm-plō'nâ:* fortified city of Spain, cap. of Navarre, of which it is the key; 1,378 ft. above sea-level, on an eminence not commanded by any neighboring height; on the left bank of the Arga, a tributary of the Ebro; 111 m. n.n.w. of Saragossa by railway, 200 m. n.n.e. of Madrid. The citadel, overlooking the river and commanding the plain, is a regular pentagon, each side 1,000 ft. in extent, and is connected with the city by an esplanade or glacis. Magnificent views of the Pyrenees on the n. are obtained from the citadel, and there are several very pleasant promenades. The *Cuenca* (plain) of P. is about 30 m. in circumference; and though the climate is somewhat chilly and damp, the gardens are fruitful and the meadows verdant. The city is well built and clean; water is brought from hills about nine m. distant, through an aqueduct built after the solid Roman style by Ventura Rodriguez (1783), a portion of which is supported on 97 arches, 35 ft. in span, 65 ft. in height. The town contains a number of squares with fountains, a theatre, and the regular *plaza de toros*—bull arena—capable, it is said, of containing 10,000 people. Agriculture, wine trade, and manufacture of linens and leather, are the noteworthy industries. P. was blockaded by the Carlists 1874.

P. was called by the ancients *Pompeiopolis*, from the circumstance of its having been rebuilt by the sons of Pompey in B.C. 68. It was taken by the Goths in 466,

by the Franks under Childebert in 542, and again under Charlemagne in 778. It was subsequently for a time in possession of the Moors, who corrupted the name Pompeiopolis into *Bambilonah*, whence the modern Pamplona. In later times it was seized by the French, in 1808, and held by them till 1813, when it fell into the hands of the allies under the Duke of Wellington.

PAMPER, v. *păm'pėr* [prov. Ger. *pampen*, to cram—from *pampe*, thick broth: Bav. *pampfen*, to stuff; *pampf*, thick gruel—a nasalized form of *pap:* Flem. *pamberāto*, pampered, full-fed]: to furnish with that which delights; to feed highly or luxuriously; to glut. PAM'PERING, imp. gratifying to the full: N. overluxurious bringing up. PAM'PERED, pp. *-pėrd:* ADJ. furnished with that which pleases the appetite; overfed: overindulged; in *OE.*, overluxuriant, as the foliage of fruit-trees. PAM'PERER, n. *-pėr-ėr*, one who pampers. *Note.*—PAMPERED in the OE. sense is properly derived from OF. *pamprer*, to cover with vine-leaves—from L. *pampinus*, the tendril of a vine.

PAMPEROS, n. plu. *păm-pē'rōz* [Sp.—from *pampa*, a plain]: violent west winds in S. Amer., which, traversing the vast plains of the pampas, bring with them whirl-clouds of dust.

PAMPHILUS, *păm'fĭ-lŭs:* Christian teacher and martyr: about 240–309; b. Phœnicia. He was educated at Alexandria, accepted Christianity, was ordained, and became a preacher and teacher at Cæsarea in Palestine, where he founded a theological school and collected a valuable library. In addition to distributing many copies of the Scriptures, he copied and circulated the works of Origen, to whom he was warmly attached. In common with other prominent Christians, he was imprisoned in the persecution by Maximin 307. During his confinement, he wrote, in connection with his pupil and friend Eusebius, an *Apology for Origen*, of which only a small portion remains, and that in a mediocre Latin translation. His *Life*, by Eusebius, has also been lost. He was put to death for refusing to sacrifice to idols.

PAMPHLET, n. *păm'flĕt* [derivation unknown; earliest appearance 1344; perhaps nasalized form of Sp. *papelete*, a written slip of paper, a news-letter: Dut. *pampier*, paper—see *Note*, below]: printed unbound book of a few pages merely stitched together; technically restricted to printed matter between 8 pages and 5 sheets, with or without paper cover; but anciently either printed or in MS. It generally contains a short treatise on some subject, political or otherwise, which is exciting public attention at the time. It was not till about the middle of the 16th c. that pamphlets began to be of common use in political and religious controversy in England and France. Under the second French empire, political pamphlets appeared from time to time, believed to be

written under imperial dictation, as feelers of public opinion. PAMPHLETEER, n. *păm′flĕt-ēr′*, a writer of pamphlets. PAM′PHLETEER′ING, a. *-ēr′ĭng*, writing and publishing pamphlets: N. the practice of writing and publishing pamphlets. *Note.*—Skeat cites L. *Pamphila*, female historian, 1st c., who wrote numerous *epitomes*—hence OF. *pamfilet*, an epitome.

PAMPHYLIA, *păm-fĭl′ĭ-â:* anciently a country on the s. coast of Asia Minor, with Cilicia on the e. and Lycia on the w. It was bounded originally on the inland or n. side by Mt. Taurus, but afterward enlarged to reach the confines of Phrygia. P. is mountainous, was formerly well wooded, and had numerous maritime cities. The inhabitants—mixed race of aborigines, Cilicians, and Greek colonists—spoke a language the basis of which was probably Greek, but disfigured and corrupted by infusion of barbaric elements: their coins show that they had adopted to some extent the religion, arts, and games of the Hellenic race. Its political history is unimportant. With Phrygia and Lycia, it fell to the share of Antigonus on the partition of the Macedonian empire. It afterward passed successively into the hands of the Græco-Syrian princes, the kings of Pergamus, and the Romans.

PAMPINIFORM, a. *păm-pĭn′ĭ-fawrm* [L. *pampĭnus*, a tendril; *forma*, a shape]: resembling a vine-tendril.

PAMPLO′NA: see PAMPELUNA.

PAMPRE, n. *păm′pĕr* [F. *pampre*, a vine-branch with its leaves—from L. *pampĭnus*, a tendril]: in *sculp.*, an ornament consisting of vine-leaves and bunches of grapes.

PAN, n. *păn* [Icel. *panna;* Dut. *pan;* Ger. *pfanne;* AS. *panne*, a pan: perhaps connected with L. *patina*, a bowl or pan]: a broad and generally shallow vessel for domestic use; the part of a gun-lock, now disused, which holds the priming; the hard stratum of earth lying below the soil. PANFUL, n. *păn′fûl*, the quantity that a pan can hold; plu. PAN′FULS. PANCAKE, n. *păn′kāk*, a thin cake fried in a pan (see below).

PAN, n. *păn* [Dut. *pan*, a frying-pan (see PAN 1)]: in *S. Africa*, a naturally circumscribed pond of any size, containing fresh or salt water, or even only mud.

PAN, *păn* [Gr. *pan*, all]: a prefix, with its forms PANT, *pănt*, and PANTO, *păn′to*, meaning 'all, everything.' PAN-ANGLICAN, PAN-AMERICAN, terms implying respectively an assembly of representatives holding the tenets and principles of Anglican Episcopalians or of representatives from all the nations of N. and S. America.

PAN, n. *păn:* in *anc. myth.*, among the Greeks, the chief god of pastures, forests, and flocks. The later rationalizing mythologists, misconceiving the meaning of his name (which they confounded with *to pan*, 'the whole' or 'the universe,' whereas it is probably connected with *paō* [Lat. *pasco*], 'to feed,' 'to pasture'), represented him as a personification of the universe:

but nothing in the myth warrants such a notion. Pan neither in his genius nor his history figures as one of the great principal deities, and his worship became general only at a comparatively late period. He was, according to the common belief, a son of Hermes (Mercury) by the daughter of Dryops, or by Penelope, wife of Ulysses; while other accounts make Penelope the mother, but Ulysses himself the father—though the paternity of the god is ascribed also to the numerous wooers of Penelope in common. The original seat of his worship were the wild hilly and wooded solitudes of Arcadia; whence it gradually spread over the rest of Greece, but was not introduced into Athens until after the battle of Marathon. Homer does not mention him. From his birth, his appearance was peculiar: he came into the world with horns, a goat's beard, a crooked nose, pointed ears, a tail, and goat's feet; and so frightened his mother that she ran off for fear; but his father, Hermes, carried him to Olympus, where all the gods, especially Dionysus (Bacchus), were charmed with the little monster. When he grew up, he had a grim shaggy aspect, and a terrible voice, which, bursting abruptly on the ear of the traveller in solitary places—for Pan was fond of making a great noise—inspired him with a sudden fear (whence the word *panic*). It is even related that the alarm excited by his blowing on a shell decided the victory of the gods over the Titans. He was the patron of all persons occupied in the care of cattle and of bees, in hunting and in fishing. During the heat of the day he used to take a nap in the deep woods or on the lonely hillsides, and was exceedingly wroth if his slumber was disturbed by the halloo of the hunters. He is represented as fond of music, and of dancing with the forest nymphs, and as the inventor of the syrinx or shepherd's flute, called also Pan's pipe. Cows, goats, lambs, milk, honey, and new wine were offered to him. The fir-tree was sacred to him, and he had sanctuaries and temples in various parts of Arcadia, at Troezene, at Sicyon, at Athens, etc. The Romans identified the Greek Pan with their own Italian god Inuus, sometimes also with Faunus: see FAUN.

When, after the establishment of Christianity, the heathen deities were degraded by the church into fallen angels, the characteristics of Pan—viz., the horns, the goat's beard, the pointed ears, the crooked nose, the tail, and the goat's feet—were transferred to the Devil himself, and thus the 'Auld Hornie' of popular Scotch superstition is Pan in disguise.

PANABASE, n. *păn'ă-bāz:* a gray ore of copper.

PANACEA, n. *păn'ă-sē'ă* [L. *panăcēa;* Gr. *panakei'a,* a herb supposed to have the power of healing all diseases—from Gr. *pan,* all; *ake'ŏmai,* I heal or cure: It. *panacea:* F. *panacée*]: a professed remedy **for all diseases; a universal medicine; a cure-all.**

PANACHE, n. *pa-nâch'* [F.—OF. *penache*—from L. *penna*, a feather; It. *pennachio*]: in *arch.*, French name for the triangular surface of a pendentive: in *old armor*, a plume or bunch of feathers set upright upon the helmet; rarely worn before the time of Henry V.

PANADA, n. *pă-nā'dă*, or PANA'DO, n. *-dō* [F. *panade;* It. *panata;* Sp. *panada*, bread-soup—from L. *panis*, bread]: a food made by boiling bread to a pulp and sweetening it.

PANAGIA, or PANAGHIA, n. *păn-ăj'ya* or *păn-ā'jĭ-a* [Gr. *pan*, all; *hagios*, holy]: appellation of the Virgin Mary in the Greek Orthodox Church: also, the pyx or case in which the 'host' is carried.

PANAMA, *pâ-nâ-mâ:* republic of Central America, bounded on the north by the Caribbean Sea, on the east by the Gulf of Darien and the Atrato River, which separate it from Colombia, on the south by the Pacific Ocean, notably on the southwest by the indenting Gulf of Mexico, and on the west by Costa Rica, the boundary being unsettled and long in dispute. The interior in general, and especially in the northwest along Mosquito Bay and in the southeast along the Atrato River is marked 'unexplored' on the most recent and complete maps of the country. The interior is thick with hills and mountains, a few being extinct volcanoes. These have no connection either with the North American Cordilleras or with the Andes. The only systematic ranges are a bit of the Costa Rica central divide, which runs over into western Panama, and on the Atlantic coast further east the Cordillera de San Blas. The detached and irregular hills are often separated by streams greatly subdivided. The banks of these streams, and, indeed the greater part of the country is covered with dense tropical vegetation. The exceptions to this rule are a few treeless uplands along the Pacific side between the Costa Rica border and the Gulf of Panama. The streams are unimportant with the exception of the ill-named Rio Grande, emptying into the Pacific near the city of Panama, and the Rio Chagres which flows into Limon Bay near Colon. The importance of these two rivers lies largely in their proximity to the projected canal. This lack of interior waterways and the general impassability of the country make the only outlet for most towns the sea and make other means of communication (save between Colon and the city of Panama by rail), as well as other location than near the sea, practically impossible. The altitude of the country varies between 200 and 1,500 metres. The climate is warm and damp, and extremely unhealthy. The terrible mortality consequent upon the canal excavations made by the French are so commonly taken to prove that the earth if merely upturned breeds a deathly miasma, the 'creeping Johnny,' that the natives neither hoe nor plow in their small agriculture. But the high death rate is quite as probably explicable by the lack of sanitation

and by the unrestrained use of mountain streams for laundries, drains, cesspools, and drinking water reservoirs.

Statistics.—With an area of 31,500 square miles and an extent east and west of 460 miles the republic of Panama has a population of scarcely 300,000 of the most heterogeneous sort. There are a few natives of Europe and of the United States, mostly engaged in the operation of the railway; many people of Spanish and Indian descent; and especially on the Atlantic coast, a number of English-speaking negroes and mulattoes. The chief commercial cities are Colon (or Aspinwall), with a population of 3,000 and Panama (q.v.), the termini of the present railroad and of the proposed canal. The commerce of the country is mainly with the United States. For the year ending 1907, June 30, Panama imported from the United States goods to the value of $16,150,953, and exported to the United States goods valued at $1,752,314.

History.—Columbus landed on the isthmus in 1502. Then came further exploration, notably by Balboa, and in train of that colonization, still in the first quarter of the 16th century. In the more flourishing days of Spanish rule in that century and the next the country in general and the city of Panama (q.v.) in particular enjoyed the advantages coming from the shipment of South American silver and gold. But this prosperity had so drooped at the close of the 18th century that Panama was largely isolated from Colombia and took comparatively little part in the various revolts that culminated in Colombian independence in 1819. Two years after that date, however, the people of Panama proclaimed their independence and became part of the republic of Colombia. This was a strongly centralized government held together by little but Bolivar's personal influence and power. It was shattered in 1831, the year after his death, and three new republics were formed, namely, Venezuela, Ecuador, and New Granada. The last named included the Isthmus. Strangely enough the form of government of the new republic was practically identical with that which had brought it to revolt against Colombia; and in the new republic of New Granada the centralized government was equally ill-adapted to its heterogeneous elements. Moreover there was no simple and speedy means of intercommunication such as might have welded the country into some national unity. In the existence of this type of government is the philosophic key to the history of both the old republic of Colombia down to 1831, and after that date of New Granada and the New United States of Colombia. It was in the very nature of things that as New Granada had broken from Colombia, so Panama, New Granada's remotest part, must break, or attempt to break from New Granada. A state's rights or Federalist party did rapidly rise throughout New Granada. In 1840 revolutions broke out in most of the provinces. An independent 'State of the Isthmus,' containing the provinces

of Panama and Veragua, was proclaimed in 1841, but the Centralists were successful, the revolution was suppressed, and the old régime was restored. The sentiment against this method of government steadily increased until in 1855 by an act of the Congress of New Granada at Bogota the autonomous state of Panama was erected out of the Isthmian provinces. But the sincerity of this act may well be questioned and its aim was probably political and the purpose to crush the Federalist party for good and all. But the attempt of the national government to revoke its act, and, it seems, to provoke a revolution, and then in crushing that revolution to put a stop to all Federal agitation, overreached itself. The revolution in behalf of the new constitution was completely successful. For a score of years and more Panama, like the other states in the Colombian Union, enjoyed (more or less interruptedly) its individual rights. A Centralist uprising in 1885, however, effected a return to old conditions. The former state of Panama was again ruled from Bogota, and became a department called Panama. This department was divided into four provinces, Chiriqui, Veraguas, Azuero, and Panama; the last named province occupied the eastern half, approximately of the department of the same name, with which it is very easily confused.

It is worth noticing in passing that during this revolution in 1885 the United States of North America landed marines to protect the transit of the Isthmus between the cities of Colon and Panama, a circumstance of material assistance to the Centralist insurgents, but an act undertaken simply for the sake of inter-oceanic and trans-Isthmian commerce. That it could have been for any reason other than this is impossible, since the right and duty of the United States to preserve neutrality in the Isthmian strip was due to a treaty made in 1846 with the government of New Granada, a government not in existence in 1885. In short the obligation was one to a territory and not to any power: and if to any power simply to that in control of the Isthmus, no matter what its relation to the original treaty-making power.

Since 1885 the relations of Panama with Colombia have been no closer nor more familiar than before. Several revolts have taken place, and in July 1900 under the lead of Porras, later a leading candidate for the vice-presidency of the republic, a desperate but unsuccessful attempt was made by a Liberal army to get control of the city of Panama. In 1903 a more successful plot was planned, growing out of the discontent of the people of Panama with the attitude of Colombia toward the Panama Canal Treaty with the United States. Whether through fear that the United States would in time gain sovereignty over the canal—there was an old saying that the canal when built would become the southern boundary of the United States—or a hope that the bid for the canal might be largely increased, the Colombian Congress refused to ratify this treaty and adjourned

1903, Oct. 31. By the terms of the Spooner Bill this made the Panama Canal apparently an impossibility and the Nicaragua Canal a certainty, for the President had been bidden to treat for the Panama Canal, and, if such negotiations failed, to carry through the project of the Nicaragua Canal. In short, the people of Panama would have been deprived of the fulfilment of their hopes of renewed commercial importance by this inexplicable action of the Colombian Congress, had not the revolution planned as early as the summer of 1903 offered a solution. How the desire for autonomy, the desire for a canal, and the desire for the money to be paid for the canal, respectively, bulked in the minds of the revolutionary plotters it is impossible to say. The foregoing sketch of Panama's political history would show at least that a revolution for purely political reasons was a possibility. The mixture of motives amounts to little more than a coincidence of several impulses, each of which alone would have been sufficient. On Nov. 3, 1903—that is three days after the adjournment of the Colombian Congress—the municipal council of the city of Panama proclaimed the independent republic of Panama. There was no bloodshed. An army of 400 Colombians (mostly boys between 12 and 14) arrived November 4 in Colon, whence its general with his staff went to Panama, was dined there, and upon his refusal to acknowledge the new republic, of which he knew nothing until the evening of the 4th, was imprisoned for a few days, but on the 7th with his army was shipped back to Cartagena from Colon. In the meantime upon the 6th of November the United States government recognized the new republic, being satisfied that there was not the slightest internal opposition to its establishment. France's recognition followed November 10, and soon afterward like action was taken by Germany, England, and Russia.

The provisional government founded November 3 was in the hands of a junta consisting of J. A. Arango, Tomas Arias, and Federico Boyd. The last-named member of the junta arrived in the United States on December 18, and late the same day a Canal Treaty was signed by Secretary of State John Hay and the minister from Panama to the United States, Philippe Bunau-Varilla, who had been formally received at Washington eight days before. This treaty is practically the same as the convention made with the Colombia; the compensation is the same; but the canal strip is made wider and the powers granted to the United States are larger. The junta named above took control of the government, being assisted by the following provisional cabinet: Minister of Government, Eusebio Morales; Minister of Finance, Dr. Manuel Amador (the successful candidate for the presidency); Minister of Foreign Relations, F. V. de la Esprilla; Minister of Justice, Carlos Mendoza; Minister of Public Instruction, N. Victoria; and Minister of War and Marine, M. de Obarrio, Jr. On December 27 a general election of delegates to a national convention took

place. In most instances municipal authorities acted as electors; the scheme of manhood suffrage originally promulgated having proved impracticable. Four delegates were chosen from each province except Panama, which elected eight, making a total of 32. These delegates, meeting 1904, Jan. 15, are called to frame a constitution and to elect a president. The provisional government ratified the Canal Treaty 1903, Dec. 2. On Feb. 16, 1904, Amador was elected president, with Arasemena, Obaldia, and Mendoza as *designados*, or vice-presidents.

The general state of unrest that prevailed in the Central American countries during 1907-8 caused some apprehension in Washington that the Panama Canal zone might in some way become affected. In Panama several political groups charged that frauds were perpetrated in the previous elections and claimed that they were denied the right to register. In order to pacify all the disputing political elements, William H. Taft, Secretary of War of the United States, was despatched to Panama. It was decided that, when the next presidential elections occurred on July 12, 1908, the United States would appoint representatives to observe the elections and if fraud were permitted that led to disorder, riot or insurrection, the United States would preserve order under the treaty. A commission of electoral inquiry was thereupon appointed by Panama to investigate the elections. There was no disorder, however, and the elections passed off very quietly, Señor Ricardo Arias the candidate of the government party for the presidency resigned his position as Secretary of Foreign Relations and withdrew from the contest. The candidate of the party in opposition to the government, José Obaldia, was elected almost unanimously, as the supporters of Arias refrained from voting.

PANAMA: city and seaport, capital of the Central American republic of Panama (q.v.), at the head of the bay of Panama on the Pacific Ocean. It occupies a coral tongue of land which extends in shallow waters some distance out to sea, and as the Pacific terminus of the Panama r.r., completed in 1855 to facilitate the gold-mining emigration to California, and of the projected isthmian canal, has long been of great commercial and political importance. The harbor is safe, but formerly vessels could not approach within three miles of the city, but anchored safely between the Pericos and Naos islets in the bay, and the mainland. An iron wharf 985 ft. long and 54 ft. wide, with a low-water depth of 45 ft., built at La Boca, the Pacific end of the canal, by the French Panama Canal Co., now accommodates vessels 500 ft. long, with a draught of 18 ft.

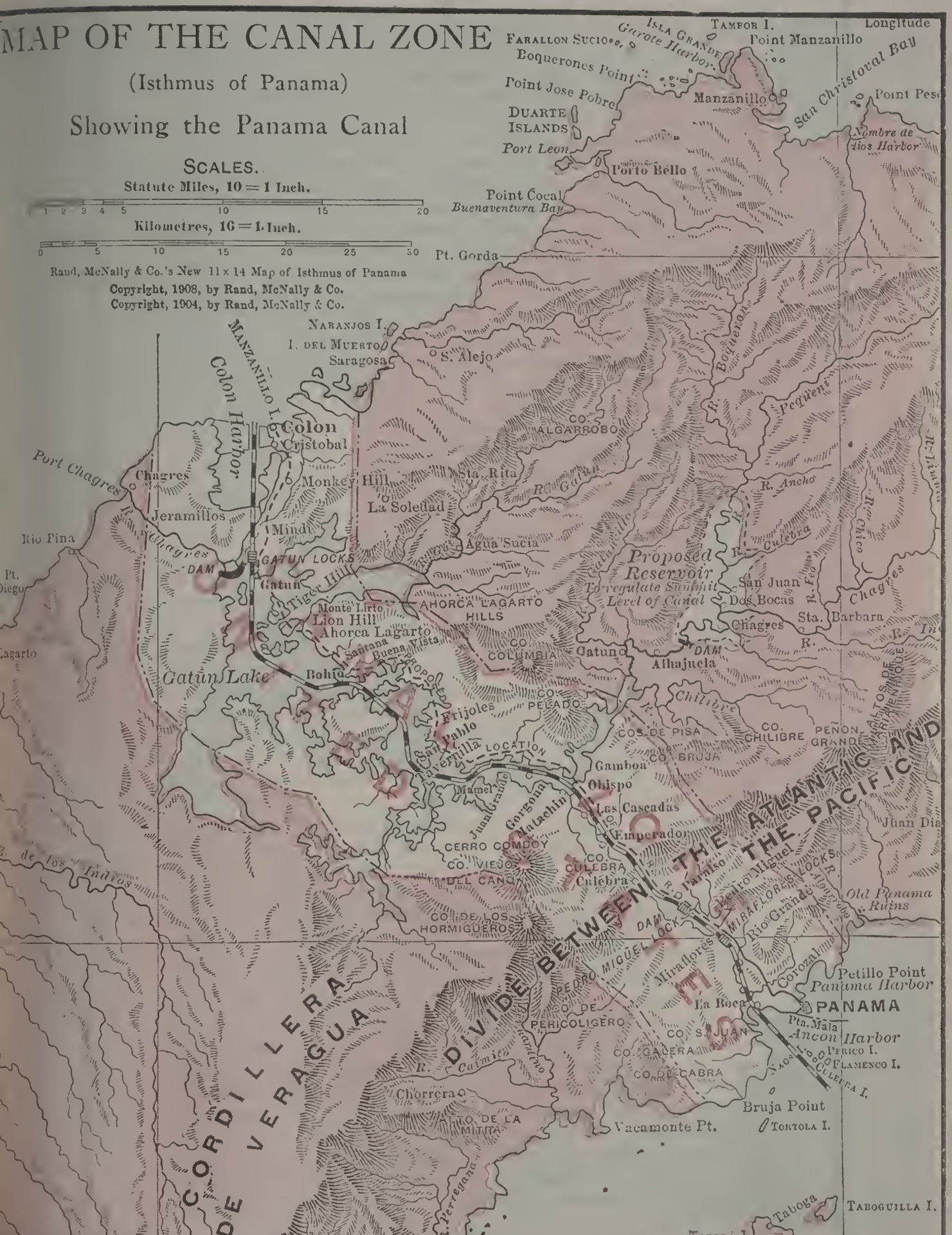
The old city of Panama, seat of the Spanish colonial government, stood 6 m. n.e. of the present city. It was founded in 1518 by Peter Arias de Avila, and was destroyed by the pirate Morgan in 1671; the old streets and ruins are still to be seen. The new city was laid out

on its present site, and wide streets with houses built of stone present a picturesque appearance against a hilly background, and a sea-frontage on three sides. Among the principal edifices are: the large and well-kept market, part of which extends over Panama bay on iron pillars; the imposing structures of the President's palace and the Canal building, the headquarters of the Isthmian Canal commission; the Bernhardt theatre, built in 1885; and the fine Ancon and Santo Tomas hospitals, seven Catholic churches, including the old shot-riddled cathedral; Episcopalian, Wesleyan and Salvation Army missions minister to spiritual needs, and a university, founded in 1751, a Jesuit college, several convents and schools supply educational wants. Santa Ana and Central Parks provide recreation grounds with periodical band concerts.

The sanitary conditions of the city have been greatly improved, and will be further bettered by the completion of the dam and waterworks at the head waters of the Rio Grande to supply an average of 60 gallons a day for each head of population.

Panama is a telegraphic station of the Pacific submarine cable. About 1,000 steamships enter and clear the port annually, and a considerable transit and local trade is carried on; the r.r. carries in the same period nearly 1,000,000 tons of freight, and over 90,000 passengers. The local exports from the port of Panama to the U. S. amount in value to about $200,000, and include hides, india rubber, cocobolo and ivory nuts, deerskins, and coffee. The U. S. is represented by a resident consul. Pop. 30,000.

PANAMA CANAL: an all-water route between the Atlantic and Pacific to run from Colon to the city of Panama. Balboa's explorations of the Isthmus were made with the particular purpose of discovering a strait which would make possible the longed-for western passage. In 1550 a Portuguese navigator, Antonio Galvãó, brought to the attention of the King of Spain a plan to cut a canal through the isthmus, but for political reasons the project was suppressed and the death penalty was attached to any attempt to reopen the matter. A canal at Nicaragua was suggested by Nelson in 1780, and in 1804 Humboldt mapped five routes, one of them between Chagres (near Colon) and Panama. Spain had determined to begin work when the country was snatched from her control in 1821 by the independence of New Granada. Guatemala, San Salvador, and Honduras tried to interest Louis Philippe in a canal in 1844, but were unsuccessful. The discovery of gold in California in 1849 renewed interest in trans-Isthmian commerce and six years later the railway between Chagres and Panama, practically the route of the canal now planned, was built. An American commission between 1870 and 1875 examined the routes proposed and declared in favor of a canal through Nicaragua. The investigation was


MAP OF THE CANAL ZONE
(Isthmus of Panama)
Showing the Panama Canal
SCALES.
Statute Miles, 10 = 1 Inch.
1 2 3 4 5 10 15 20
Kilometres, 16 = 1 Inch.
0 5 10 15 20 25 30
Rand, McNally & Co.'s New 11 × 14 Map of Isthmus of Panama
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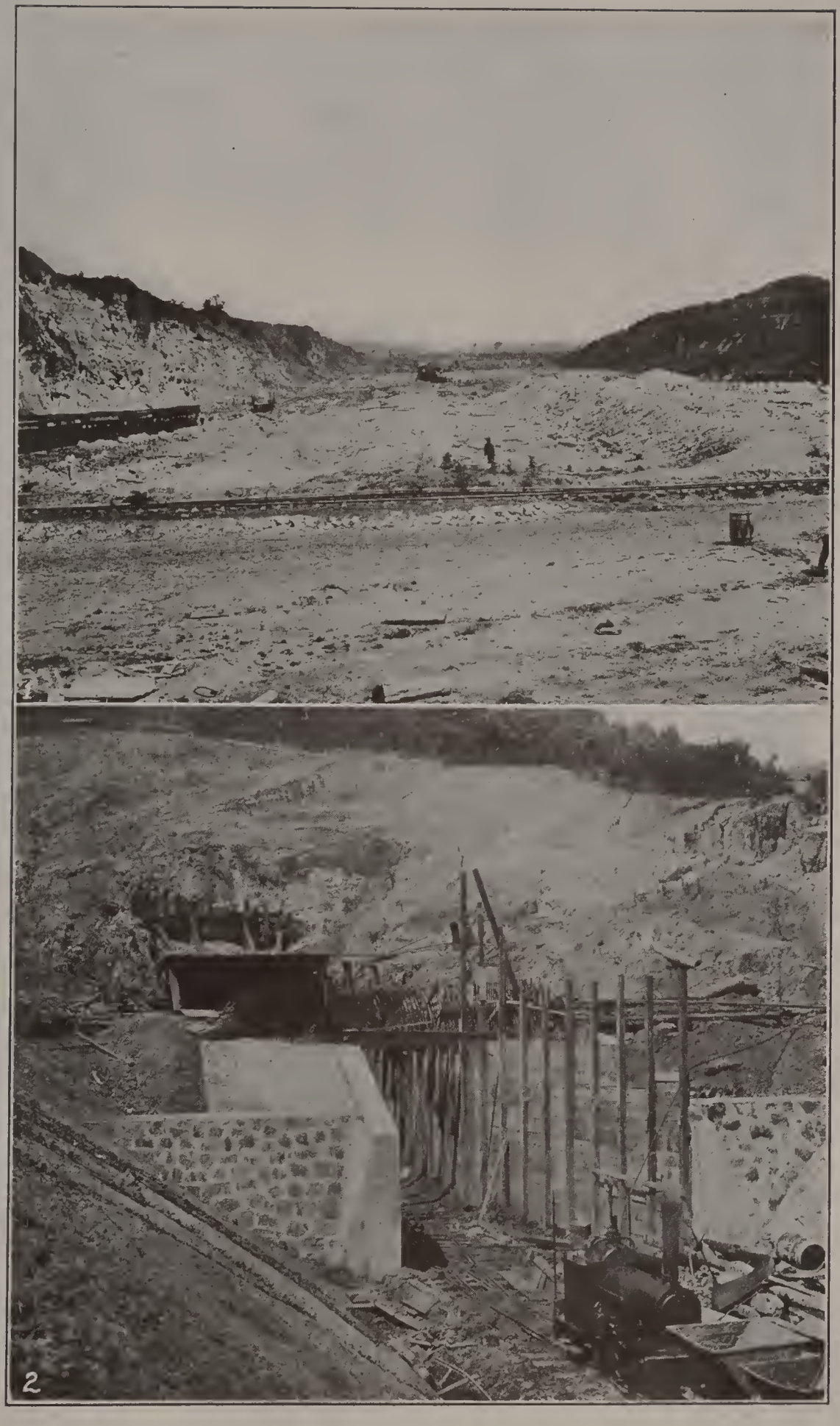
Longitude
Tambor I.
Farallon Sucio
Isla Grande
Garote Harbor
Point Manzanillo
Boquerones Point
Point Jose Pobre
Manzanillo
San Christoval Bay
Point Pes
Duarte Islands
Port Leon
Nombre de Dios Harbor
Porto Bello
Point Cocal
Buenaventura Bay
Pt. Gorda
Naranjos I.
I. del Muerto
Saragosa
Manzanillo I.
Colon Harbor
Colon
Cristobal
S. Alejo
R. Boquerones
R. Pequeni
Co. Algarrobo
Port Chagres
Chagres
Monkey Hill
Sta. Rita
R. Gatun
R. Ancho
Jeramillos
La Soledad
Mindi
Rio Pina
R. Chagres
Gatun Locks
Dam
Agua Sucia
R. Culebra
R. Chico
Pt. Diego
Gatun
Tiger Hill
Proposed Reservoir
To regulate Summit Level of Canal
San Juan
Dos Bocas
R. Trinidad
Monte Lirio
Lion Hill
Ahorca Lagarto
Ahorca Lagarto Hills
Chagres
Sta. Barbara
Lagarto
Santana
Buena Vista
Co. Columbia
Gatun
Dam
Alhajuela
Gatun Lake
Bohio
Co. Pelado
Chilibre
Frijoles
Co. de Pisa
Co. Chilibre
Penon Grande
San Pablo
Tavernilla
Location
Co. Bruja
Gamboa
Obispo
Mamei
Las Cascadas
Juan Grande
Gorgona
Matachin
Emperador
Juan Dia
Cerro Comboy
Co. Viejo
Co. Culebra
Culebra
Parisio
Pedro Miguel
Old Panama Ruins
Del Cano
Rio Grande
Miraflores Locks
Co. de los Hormigueros
Miraflores
Petillo Point
Panama Harbor
Pedro Miguel Lock
Corozal
La Boca
Panama
Co. de Pericoligero
Pta. Mala
Ancon Harbor
Co. S. Juan
Co. Caleta
Perico I.
Flamenco I.
Co. de Cabra
Culebra I.
Chorrera
Bruja Point
Vacamonte Pt.
Tortola I.
Taboga
Taboguilla I.
Taboga I.
Cordillera de Veragua
Divide between the Atlantic and the Pacific

renewed with greater care upon the suggestion of the International Congress of Geographical Sciences which met in Paris in 1875. From the end of 1876 to the spring of 1879 a French commission, led by Bonaparte Wyse, made careful surveys in the Isthmus. Acting upon these in 1879 an International Congress, meeting in Paris and convened by Ferdinand de Lesseps, decided that the best route for a canal was from the Bay of Limon to the Gulf of Panama and that the canal should be a tide-water canal. Almost a year before the meeting of this Congress Wyse had received from Colombia permission to build the canal. This concession he had immediately transferred to de Lesseps, who at the second attempt managed to float the first Panama Company. The expense was tremendous, and it was necessary to issue loan after loan until in 1888 the French public refused to buy anywhere near the total amount of stock offered. On Feb. 4, 1889 the Company was declared insolvent and a receiver was appointed. A commission sent to the Isthmus in 1890 reported that a canal with locks could be finished in eight years at an expense of 900 million francs ($180,000,000). There had been rumors of mismanagement even before the dissolution of the company in 1889, March, and 1891, June 11, an investigation into the affairs of the company was ordered. It lasted 17 months, and was followed by another from 1892, November, to 1893, June, and a third from 1897, June, to 1898, July. Bribery, corruption and maladministration were brought to light. But the case was so enmeshed in politics and involved so many in high position that justice was never done; apparently great injustice was done to de Lesseps and his son, who were convicted in 1893 of misappropriation of funds, sentenced to fine and imprisonment, and never punished. Though occasional spasmodic attempts were made to carry on the work, for the most part to come up to the requirements of repeated renewals and extensions of time from the Colombian government, this was the end of French activity in Panama save on a small scale. American interest in an interoceanic waterway was sharply aroused by the exigencies of the war with Spain. Going on the results of the Commission which had reported in 1876 every one turned to the Nicaragua project; the Panama Canal seemed out of the question. And a new commission appointed by President McKinley in 1899 also reported in favor of the Nicaragua route, being influenced to do so by the prohibitive price first set by the French company on its franchise and property in Panama. But a supplementary report in favor of the Panama Canal followed the offer of the French company to sell for $40,000,000, the valuation set by the American Commissioners. Both houses of Congress had previously shown their readiness to vote for the Nicaragua scheme; and in the Senate particularly its adherents under the leadership of Senator Morgan of Alabama, chairman of the Senate's Committee on Canals, seemed pledged to

that route. The Senate, however, was quickly won over by the efforts of Senator Hanna, who had become interested in the Panama scheme, it is said, by the efforts of Philippe Bunau Varilla, one of de Lesseps' engineers, and later minister of the republic of Panama to the United States. The House of Representatives was brought over by the compromise measure called the Spooner act, which was passed in January 1903. It authorized the President to carry through such negotiations with Colombia as would assure the digging of the Panama Canal, and, if this proved impossible, to treat with Nicaragua and build the canal along the route originally recommended by the Walker Commission. The title of the French company was first investigated and 1903, Feb. 16, the United States accepted the offer of the Panama company to sell out for $40,000,000, on the condition that terms could be made with Colombia. The Hay-Herran treaty was signed by representatives of the two governments after long delay; was sent to the Senate for ratification in January 1903; was successfully opposed by Senator Morgan and his few followers through the session of the 57th Congress; and was passed upon favorably March 18 in special session after a debate of almost exactly a fortnight. This treaty arranged for the payment of $10,000,000 for the concessions, a payment of $250,000 per annum beginning in the tenth year after the ratification of the treaty, and in return a lease of the canal for 100 years, with the privilege of continued renewals at the pleasure of the United States. The Clayton-Bulwer Treaty had previously been revoked and superseded by the Hay-Pauncefote treaty of 1901, so that Great Britain allowed the right of the United States to build and police the canal alone. But all obstacles were not removed even yet, for the Colombian Congress now refused to ratify the treaty which had been signed by its representative in Washington. This obstacle was removed 1903, Nov. 3, by the declaration of the independence of the Republic of Panama (q.v.), which immediately sent one member of its provisional junta to Washington, where November 18 the Hay-Varilla treaty was signed. This treaty was ratified in Panama 1903, Dec. 2. By its terms the United States guarantees and will maintain the independence of the Republic of Panama. Panama grants the use in perpetuity of a zone 10 miles wide and its exclusive control for police, judicial, and other purposes; cedes territory for subsiduary canals and the coast line within the zone; and if police and other matters in the cities of Panama and Colon prove unsatisfactory, the United States government may intervene. The canal is to be neutral and open to the world's commerce. For these grants the United States was to pay $10,000,000 on the ratification of the treaty and $250,000 yearly, beginning nine years after. The sovereignty of Panama over all her territory was to be recognized. On April 22, 1904, the Panama Canal Company transferred



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1. Gatun Lock, Looking North.
2. South End of the Miraflores Tunnel.

its rights to the United States and on May 9 was paid the stipulated $40,000,000, at the same time $10,000,000 being paid to the Republic of Panama.

Major-General Whitfield Davis was appointed head of the Canal Commission with gubernatorial powers within the zone, his assistants being William Barclay Parsons, N. Y.; Wm. H. Burr, N. Y.; Benjamin M. Harrod, La.; Carl Ewald Crinsky, Cal.; and Frank J. Hecker, Mich. The preparatory work of construction was begun on the plan of high-level locks, as favored by Congress in 1902. In this plan the physical difficulties of the Culebra cut through the continental divide near the Pacific, and the floods of the Chagres river, which latter flows down from the northeast, intercepts the line of the canal about its centre, and coincides more or less with the general route of the canal from the point of interception of its Atlantic terminus, had to be overcome. The problem was to be solved by cutting a tide-level canal for the first 16 miles from the Atlantic to Bohio, where a dam was to be thrown across the Chagres river, of sufficient height to form a great lake in the valley of the Chagres, at a maximum elevation of 90 feet above mean sea-level. Allowing for the greatest possible variation due to continued drought or to heavy freshets the level of the lake was to be maintained between the extremes of 82 feet as a maximum level above the sea at mean tide. The surplus waters of the rainy season were to be discharged over a weir 2,000 feet in length, built not far from the Bohio dam, the waste waters being conducted to the Atlantic partly by the Chagres river and partly by artificial channel. At Bohio a double lift lock was to be located with a total maximum lift of 90 feet. The line of the canal would traverse the Bohio lake thus formed for a distance of about 14 miles, or until it reached Obispo, where a set of gates 100 feet wide were to be placed. The purpose of the gates was to retain the waters of Lake Bohio should it at any time be desirable to drain off the waters of that portion of the summit-level lying beyond the gates. Passing through the gates the canal would enter the Culebra section, which consists of a great cut through the continental divide, about eight miles in length, with the Pedro Miguel locks at the Pacific end. A level 1.33 miles in length would lead to the Miraflores locks, by means of which the descent to the tide-level on the Pacific would be made, the distance from the Miraflores locks to the six-fathom line on the Pacific being 8.5 miles.

The average summit-level proposed was to be 85 feet above mean tide. This was to be secured by the Bohio dam, the most important structure of the high-level canal. The dam proposed by the French Panama Company was to have been of clay founded upon a variety of material—hard clay, so clay, sand, gravel, etc. The Isthmian Canal Commission decided upon a core-wall-and-earth-dam, the core-wall to be carried down everywhere to rock, the latter being reached in places at a

depth of 128 feet below sea-level. The cost of the dam was estimated at $6,369,640, and as it would probably take 10 years to build, it would be the controlling feature in the question of time required to construct the high-level canal.

On Dec. 19, 1904, however, the chief engineer of the Isthmian Canal Commission laid his report before the Congressional Committee of Commerce. He was in favor of a return to the original plan of a sea-level canal as the best and cheapest in the end. The cost was estimated at $300,000,000 and the time of construction 20 years.

Early in 1905 the Engineering Committee consisting of Messrs. Burr, Parsons, and Davis also issued a report recommending a sea-level canal, which they estimated could be completed in 10 or 12 years for $230,500,000. As outlined by them the canal is to extend 49 miles from the 36-foot depth mark in Colon harbor on the Atlantic to the similar depth mark in Panama harbor on the Pacific, and with a bottom width of 150 feet, is to be 30 feet in depth. The first section from the Atlantic to Bas Obispo is 29 miles of low, marshy, and unhealthful surface, thick with tropical vegetation: work here is facilitated by the considerable amount of excavation done by the French Company, and a stretch of completed waterway. The second and most difficult section of the canal is in the hill ground from Bas Obispo to Pedro Miguel, 7.91 miles, and is known as the Culebra Cut. It is so well chosen, however, that it affords the lowest crossing in the ridge between the oceans. The third section from Pedro Miguel to the Pacific, nine miles, is similar to the Atlantic side, low and marshy. The chief difficulties to be overcome are keeping the floods of the Chagres river under control and the cut through the rocky height of the Culebra ridge, the isthmian backbone and continental divide that rises 300 feet above sea-level, nine miles from the Pacific.

The intention of building the canal with high-level locks, as planned by Congress in 1902, was recommended to be waived in favor of a sea-level waterway. The general plan to construct the most important dam at Bohio was abandoned for the safer rock foundations at Gamboa where a dam 200 feet high was planned to be built, and a tunnel 10 miles long and 30 feet in diameter bored through the Culebra ridge at a height of 132 feet to carry the surplus flood waters of the Chagres to the Pacific. Part of the canal would utilize the course of the Bohio Lake and the Obispo river. Although planned as a sea-level waterway, the tidal differences in both oceans necessitates a lock at Miraflores, a short distance from Panama. On the Atlantic side the tidal fluctuation is less than two feet; on the Pacific side 20 feet. The lock, built on concrete upon rock foundations, would be 1,000 feet long, of twin construction, with guard gates and intermediate gates of steel. A break-water at Colon to form an outer terminal harbor on the Atlantic side is

also projected, and is to be built from rock quarried from the Culebra cut, the transport of which is facilitated by the Panama railroad built in 1855. The latter is, in the main, parallel to the course of the canal, and was acquired by the United States government as indispensable to the work on the canal.

In consequence of the recommendation a series of radical alterations were made in the United States programme for 1905, but, on March 30, Secretary Taft sent to President Roosevelt a drastic statement concerning the whole scheme, which was acted upon with such promptitude that an executive order was issued on April 3, reorganizing the Canal Commission.

The salaries of the Commissioners were resettled and their duties defined. Theodore Perry Shonts, Ill., was appointed chairman at an annual salary of $30,000; Charles E. Magoon, Neb., to act also as governor of the Canal Zone and as U. S. minister to the Republic of Panama, $17,500; John F. Wallace, Ill., chief engineer, $25,000; Rear-Admiral Mordecai T. Endicott, U. S. N., $7,500; Brig.-Gen. Peter C. Hains, U. S. A., retired, $7,500; Col. Oswald H. Ernst, corps of engineers, U. S. A., $7,500; Benjamin M. Harrod, $7,500. President Roosevelt issued a comprehensive list of instructions concerning the duties of the new commissioners and the administrative work of the canal, simultaneously with their appointment, and organizing at once the Executive Committee proceeded to Panama and assumed charge of the construction preparations. The Executive Committee comprised three commissioners in charge of special departments. The chairman, Theo. P. Shonts, presided over the first department, embracing the fiscal affairs of the Commission, and the purchase and delivery of materials. Governor-General Chas. E. Magoon superintended the second department, embracing the government of the Canal Zone and its sanitation, and the chief engineer had charge of the third department, embracing the engineering work of the canal. On June 29 it was announced from Washington that the resignation of Mr. Wallace, chief engineer, had been accepted, after a strongly-worded arraignment on public duty from Secretary Taft. He was succeeded by Mr. J. F. Stevens of the Chicago, Rock Island and Pacific Railroad Commission as railroad expert.

Among other recommendations of Secretary Taft was the formation of an advisory board to consider the best design of canal. A board of consulting engineers was appointed upon which were representatives of Germany, England, France, and the Netherlands, nominated by their respective governments at the invitation of President Roosevelt. The members were Gen. George W. Davis, chairman; William Barclay Parsons; W. H. Burr; Gen. Henry L. Abbot; Eugene Tincauzer (Germany); Edouard M. Quellenec (constructing engineer of the Suez Canal Staff); Adolphe Guérard (French); J. W. Welcker (Dutch); Isham Randolph, F. P. Stearns, Joseph Ripley, W. H. Hunter (Manchester, England).

After numerous sittings in Washington the board of consulting engineers divided in vote 1905, Nov. 17, on the plan of canal to be recommended to the President as follows: For a sea-level—Gen. George W. Davis, chairman; William Barclay Parsons and William H. Burr (America), William Henry Hunter (England), Adolphe Guérard and Edouard M. Quellenec (France), Eugene Tincauzer (Germany) and J. W. Welcker (Netherlands). For a lock-canal—Gen. Henry L. Abbot, Joseph Ripley, Alfred Noble, Isham Randolph and Fred P. Stearns (America).

Meanwhile preparatory work proceeded upon the canal cuttings, large bodies of men and much new machinery being employed. But during the summer of 1905 the work of excavation had to be virtually suspended. The mortality had proved alarming, and Governor Magoon diverted most of the labor upon sanitary work, which should have been undertaken at the commencement. Considerable attention was devoted to the draining and oiling of marshes for the destruction of mosquitos propagating malaria and yellow fever, to the sewerage systems of the isthmus, and to a good water supply for the cities of Panama and Colon by the construction of a dam at the headwaters of the Rio Grande, with the result that the mortality from yellow fever was soon completely reduced. The housing, provisioning, and entertainment of the laborers in the zone were also arranged on a generous scale.

The report of the board of consulting engineers was submitted to the consideration of the Senate Committee on Interoceanic Canals, and extended deliberations took place upon the two problems of a high-level canal to cost $147,000,000, and not more than eight years to build, and a sea-level waterway to cost about $250,000,000 and from 12 to 15 years to build. Owing to the greater cost of and longer time for constructing a sea-level canal it was considered probable that the lock-canal plan would be recommended for the decision of Congress, a view supported by Secretary Taft, Chairman Shonts, Chief Engineer Stevens, and other members of the Isthmian Canal Commission. On March 17, 1906, the majority report of the Senate Committee on Interoceanic Canals in favor of a sea-level type of canal was submitted by Senator Kittredge. Concerning the division among experts as to the best type of canal, the report says that the following propositions were considered irrefutable: The ideal canal is one at sea-level; its construction would be attended with no more, and probably with less, hazard than one with locks and dams on doubtful foundations; the sea-level canal is safer and more convenient than one with locks; it would take but little longer time to build; it is the simpler and more economical in operation and maintenance.

The dangers to which a lock canal would be exposed in case of earthquake shocks such as had caused the recent disaster in San Francisco were emphasized. The

report further asserted that while the cost of the lock canal is uncertainly estimated at about $190,000,000, the ultimate final cost of the sea-level plan as estimated by the majority is $250,000,000, but the cost of transforming the lock plan into a sea-level canal after the former is completed would be at least $200,000,000.

Ships of all classes could pass through the sea-level canal in eight hours, while half that time would be consumed in passing ships through locks alone.

On June 15, 1906, Congress in committee of the whole voted in favor of a high-level lock canal by a majority of 110 to 36, and on June 21 the Senate by a test vote of 35 to 31 also declared for a lock canal. President Roosevelt signed the bill 1906, June 29.

Thus as finally decided upon the Panama Canal may be described as follows:

The summit level will be about 85 feet above the sea, this level to be reached by a flylet of locks located at Gatun on the Atlantic side and by one lock at Pedro Miguel, with two others at La Boca on the Pacific side, all locks to be in duplicate. A large dam will be constructed at Gatun and a small one at Pedro Miguel in order to form this high level summit, beside which a second lake will be formed with a surface elevation of 55 feet on the Pacific side between Pedro Miguel and Panama Bay by building a dam at La Boca across the mouth of the Rio Grande to Sosa Hill and another dam between Sosa Hill and Corozal Hill. This second lake will be known as Sosa Lake and its area will be about eight square miles. The Gatun dam will form a reservoir with an area of about 110 square miles, which will receive the flood waters of the Chagres river.

The first section of the canal—the Colon section is from the Caribbean Sea to the mouth of the Mindi river, where a channel of 500 feet bottom width and of a depth of 42 feet below mean tide is to be excavated. These dimensions will be maintained until the Gatun locks are reached. From the Gatun locks the channel will be at least 1,000 feet wide and 45 feet deep for a distance of 15½ miles—or until reaching San Pablo; farther up the lake the width of the channel will be decreased, between San Pablo and Juan Grande, 3.86 miles, to 800 feet; between Juan Grande and Obispo, 3.73 miles, to 500 feet; and between Obispo and Las Cascadas, a distance of 1.55 miles, to 300 feet.

From Las Cascadas to a place near Paraiso (this section being known as 'the Culebra Cut'), 4.7 miles, the width will be 200 feet; thence to the Pedro Miguel lock, 1.88 miles, again 300 feet; again widened to 500 feet from Pedro Miguel lock for a distance of 1.87 miles and still again to 1,000 feet to the Sosa locks on the shore of Panama Bay, a distance of 3.61 miles. From Sosa locks to the deep water of Panama Bay a channel about 4 miles long will be excavated with a bottom width of 500 feet and a depth of 50 feet below mean tide.

After a decision had been reached covering the style

of canal to be built, difficulties arose over securing a sufficient force of unskilled labor. West Indian negroes were tried, but proved unsatisfactory, and finally Chinese coolie labor was determined upon. But before any definite steps were taken toward employing such labor, it was decided to build the canal by contract. Bids were therefore called for, but only two were received on the date set, 1907, Feb. 7, and as these were not considered satisfactory, it was decided that the government should continue the construction work and also without Chinese coolie labor.

Meanwhile Chairman Shonts had resigned on January 23, 1907, to accept another position. Mr. John F. Stevens, the chief engineer, was thereupon appointed chairman of the commission in addition to his work as chief engineer, but he, too, in turn, after a serious disagreement with President Roosevelt over the conduct of affairs, resigned on March 4. Subsequently on April 1, the President appointed Lieutenant-Colonel George W. Goethals, of the army engineer corps, chairman of the commission and chief engineer, and all members of the commission were moved to the isthmus where all the most important work is now done.

Late in 1907, as it was feared the canal locks would not be wide enough if made only 100 feet, the members of the Commission took the matter under consideration and in 1908 it was decided to make the locks 110 feet in width.

Up to 1908, May 17, the expenditures amounted to $141,687,468.58, including the $50,000,000 purchase price, $35,000,000 for construction and about $25,000,000 for plant and equipment, the balance being for general and miscellaneous expenses, loans, etc. For 1909 the appropriation made for expenditures was $29,277,000. In July 1908 there were 44,000 employees on the rolls of the commission and Panama railroad, of whom 6,000 were Americans; of these only 30,541 were actually at work—25,338 on the canal and 5,153 on the Panama railroad. By 1908 44,107,415 cubic yards of earth and stone had been removed, of which 30,070,717 cubic yards were taken out in the previous 12 months, in June 1908 the amount being 3,059,069 cubic yards.

PANAMA, ISTHMUS OF: the tongue of land connecting the northern and southern American continents and varying in width from 30 to 70 miles. The isthmus runs east and west with a double curve in either coast line, so that the western hollow made by Mosquito Bay on the north side and the eastern indentation of the Gulf of Panama on the south side, each with a corresponding bulge opposite, give the entire isthmus the shape of a recumbent S or of the sign of variation. In this more extended use of the term the words Isthmus of Panama are applied to the entire republic of Panama (q.v.), that is, what was formerly the department of Panama. The term is also used of the eastern and narrower part, cor-

responding roughly with the former province of Panama; to this part the name of Darien was originally applied. The isthmus was reached by Columbus in 1502, and was an immediate field for Spanish civilization. It was crossed in 1513 by Balboa, who 'from a peak in Darien' discovered the Pacific. The cities of Panama and Nata were colonized before 1520. The isthmus was also the scene of the Darien scheme of colonization fathered by William Paterson. In spite of its having been known so long to European explorers, large parts of the isthmus to the west of Colon are unexplored. The contour of the isthmus is broken by irregular hills much worn by erosion.

PAN-AMERICAN EXPOSITION: a great fair held in Buffalo, N. Y., from May 1 to November 1, 1901. It was so called from the large number of exhibits brought from Central and South America. The numerous buildings were made of staff, as were those of the Columbian Exposition, but were tinted a soft greenish-blue, thus avoiding the glare of the pure white. Power for the electrical exhibit was derived from Niagara Falls. Over 5,000 horse-power and 200,000 incandescent lamps were used. The electrical tower alone had 44,000 electric lights on its sides. The 'Midway,' a section of the grounds devoted to various kinds of shows and entertainments, was very popular. It included a Japanese village, an Indian Congress, panoramas, etc. Financially the exposition was a failure, due largely to President McKinley's assassination, which caused a temporary closing. The total cost of the exposition was $8,860,757.20; the total receipts $5,478,589.37.

PANARY, a. *păn'ă-rĭ* [L. *panarium*, a bread-basket—from *panis*, bread]: of or relating to bread. PANARY FERMENTATION, a process of raising bread, or making it light and spongy.

PANATHENÆ, *păn-ăth-ē-nē'â:* most famous and splendid festival of Attica, celebrated at Athens in honor of Athene, patron goddess of the city, and intended to remind the people of Attica of their union into one community by the mythical Theseus. Before the time of Theseus, or—more precisely—before the formation of the Attic confederacy, this festival was only for the citizens of Athens, and was called simply *Athenæa.* According to tradition, the Athenæa owed its origin to King Erichthonius about B.C. 1506 or 21. The later Panathenæ appears to have been a double festival. All writers who mention it speak of a Lesser and Greater Panathenæ, the former held annually, the latter every fourth year. Both took place in the month *Hecatombæon* (July), and lasted several days. The Lesser Panathenæ was celebrated with gymnastic games, musical competitions, declamations, and a torch race in the evening, the whole concluding with the sacrifice of an ox. The prize of the victors was a vessel filled with oil from the sacred tree on the Acropolis. The Greater Panathenæ differed

from the Lesser only in being more solemn and magnificent. Rhapsodists sang the Homeric poems; dramatic representations were given; and a splendid procession moved to the temple of Athene Polias, on the last day of the festival, to present the goddess with a *peplus* or embroidered robe, of crocus color, woven by the maidens (*ergastinai*) of the city. The whole population of Attica poured forth on this occasion. The procession is grandly sculptured on the frieze of the Parthenon by Phidias and his disciples.

PANAX, n. *păn'ăks* [Gr. *pan,* all; *akŏs,* a remedy]: a genus of plants, ord. *Araliăcĕæ,* species of which produce the famous ginseng root of the Chinese, which is alleged to possess wonderful medicinal properties; the roots of *Păna̍x quinquĕfōlĭum* possess qualities similar to the ginseng. *P. lanciniātus,* elegant greenhouse plants, having alternate leaves, deeply cut, and of a pleasing green color. See GINSENG.

PANAY, *pâ-nī':* Philippines, the most northwestern island of the Visayan group, lying a little to the southeast of the center of the archipelago, bounded on the east by Iloílo Strait, and on the west by Mindoro Sea; area 4,752 square miles, with dependent islands 5,103 square miles. The largest of the dependent islands is Guimarás (243 square miles), lying to the southeast of Panay.

Topography.—The shape of the island is roughly triangular. A mountain range extends from the peninsula of Buruanga in the northwest to the extreme south, and from Maymagui Mountain, in the center of this range, another mountain system extends to the east and north. The island is thus naturally divided into three provinces. There are three large rivers, the Panay, Jalaur, and Aclán, and numerous smaller streams. The coast on the east and north is well indented with bays and harbors, 15 of which afford safe anchorage for vessels of all sizes; the best harbor is at Iloílo.

Industrial Resources.—The chief industry of Panay is agriculture; cotton, corn, chocolate, pepper, coffee, tobacco, sugar, rice, and copra are raised; the last three are the staple crops, and of excellent quality. There are also large numbers of live stock raised, cattle, carabaos, and horses, excellent grazing lands being found in all parts of the island. The forests are valuable; among the more important woods are molane, ebony, and sibucao, large quantities of which are exported; honey, wax, and pitch are also gathered in considerable quantities. The mineral resources have not been scientifically developed; gold is found and is mined in small quantities; and fine marbles and tonalite are quarried to some extent; there are deposits of gypsum, marl, and iron; quicksilver and copper are also reported. The mechanical industries are well advanced and produce for export; fine fabrics of pineapple fibre, jusi, sinamay, and cotton are manufactured; also sugar sacks, hats, and

palm-leaf baskets; the woven fabrics of the province of Antique are especially well known, the looms giving employment to over 12,000 women; lime of good quality is manufactured in Iloílo. The fisheries are also valuable, particularly those of the island of Guimarás. There is a large foreign trade, the town of Iloílo being next to Manila in commercial importance.

People and History.—The people of Panay are almost entirely of Visayan race; a few thousand wild Mundos and a few Negritos live in the mountains. This island was a stronghold of the Filipino insurrection; it was first occupied by United States troops in the early part of 1899, when a base of operations was established at Iloílo; the enemy's force in that province was dispersed and order established. Cápiz was occupied in the same year, and San José de Buenavista, the capital of Antique, was taken in 1900; but the American advance was vigorously resisted, and the island was not completely pacified until 1901, January. Civil government was established under military control, and public schools put in operation as soon as possible, until the permanent government was organized under the provincial government act of the Philippine Commission in 1901, April. The island was divided into three provinces (in accordance with the natural divisions), Antique, Cápiz, and Iloílo; the former Spanish commandancia of Concepcion was consolidated with Iloílo. Pop. 801,900.

PAN'CAKE: article of food prepared by pouring a rich batter of flour, eggs, and milk into a frying-pan, so as to cover it about half an inch in thickness; the pan having been previously heated, and well supplied with butter, lard, or olive-oil. A quick fire is necessary to cook it well, and, when the under side is done, a dexterous cook by jerking the frying-pan manages to reverse the cake, so as to bring the upper side downward, to be cooked in its turn. It is now a common practice to make pancakes rather smaller than the bottom of the pan, and frequently to add minced apples and other materials to vary and flavor them; these are often called Fritters.—In England this dish is particularly associated with Shrove Tuesday; but the origin of the connection is not clear: perhaps it is the relic of a heathen custom. The Saxons called February *Solmonath*, 'which,' says a writer in *Notes and Queries* (First Series, V. 491), 'Dr. Frank Sayers, in his *Disquisitions*, says is explained by Bede, *Mensis Placentarum*, and rendered by Spelman, in an inedited MS., "Pancake month," because, in the course of it, pancakes were offered by the pagan Saxons to the sun.'

PANCART, n. *păn'kârt*, or PANCHARTA, n. *păn-kâr'tă* [Gr. *pan*, all; Gr. *chartēs;* L. *charta*, paper]: a royal charter to a subject confirming him in all his possessions.

PANCH, n. *pănsh* [It. *pancia;* F. *panse;* Sp. *panza*, the belly of an animal, or the skin that covers it (see

under PAUNCH)]: among *seamen*, a thick, strong mat used to prevent friction. PANCHWAY, n. in *Bengal*, a four-oared passenger-boat.

PANCHATANTRA (literally, 'the five books'): celebrated Sanskrit fable-book of the Hindus, whence the *Hitopades'a* (q.v.) was compiled and enlarged. Its authorship is ascribed to a Brahman named Vishn'us'arman, who, according to a later recension, composed it for the instruction of a king's unruly sons; but this story has little evidence in its favor. The arrangement of the Panchatantra is quite similar to that of the *Hitopades'a*. The fables are in prose, and the morals drawn from or connected with them are interwoven with the narrative in verse; many such verses, if not all, being quotations from older works.—On the history of the Panchatantra and its relation to the fable-books and fables of other nations, see the excellent work of Prof. Theodor Benfey, *Panchatantra: fünf Bücher indischer Fabeln, Märchen und Erzählungen* (2 vols. Leip. 1859).

PANCOAST, *păn'kōst*, JOSEPH, M.D.: 1805-1882, Mar. 7; b. Burlington co., N. J. He graduated from the Univ. of Pennsylvania 1828, and began teaching surgery 1831. For a long period he was connected with various hospitals in Philadelphia, was professor of surgery in Jefferson Medical College 1838-47, and professor of anatomy 1847-74. He resigned in the latter year and was succeeded by his son William H. Pancoast. He was a remarkably skilful operator, devised many improved methods, and made some important discoveries. Besides contributing to leading medical journals, he translated and edited various works, and published a valuable *Treatise on Operative Surgery* (1844). He died in Philadelphia.

PANCRATIUM, n. *păn-krā'shĭ-ŭm* [Gr. *pan*,. all; *kratos*, bodily strength]: in *anc. Greece*, a trial of strength combining boxing, wrestling, and running. PANCRATIC, a. *păn-krăt'ĭk*, or PANCRAT'ICAL, a. *-ĭ-kăl*, excelling in gymnastics; excelling in bodily strength.

PANCREAS, n. *păn'krē-ăs* [Gr. *pangkreas*, the sweetbread—from *pan*, all; *krĕăs*, flesh]: large gland under and behind the stomach; the sweetbread of cattle. PAN'CREAT'IC, a. *ăt'ĭk*, pertaining to or secreted by the pancreas. PAN'CREATIN, n. *păn-krē'ă-tĭn*, albuminoid principle present in pancreatic juice: it is a proteid substance, forming the active principle of the pancreatic juice, having the property of converting starch into sugar.—The *Pancreas* is a conglomerate gland, lying transversely across the posterior wall of the abdomen, 6 to 8 inches in length, about an inch and a half in breadth, and half an inch to an inch in thickness; usual weight about three ounces. The head of the pancreas lies in the concavity of the duodenum. The secretion of this gland, or the pancreatic fluid, is conveyed from its various parts by the pancreatic duct to the duodenum. This gland is found in all mammals, birds, reptiles, amphibians, and

osseous fishes, and in some cartilaginous fishes. For the physical and chemical characters of the pancreatic fluid, and its uses in the animal economy, see DIGESTION.

The pancreas of ruminating animals is a favorite article of food under the name sweetbread: it is either boiled or fried. That of the calf is best esteemed, but that of the lamb is often substituted for it. Some medical authorities question whether the usual estimate of the calf's sweetbread is warranted by its nutritive qualities. The thyroid and sublingual glands also are used as sweetbread.

PANCREAS, DISEASES OF THE: Diseases of the pancreas are among the uncommon ailments and on this account, as well as on account of the frequently obscure symptoms associated with them, their existence may be overlooked. It is certain, however, that with a wider adoption of accurate clinical methods of observation this class of disease will be found to be more prevalent than was formerly supposed.

Hemorrhage of the pancreas (*Pancreatic Apoplexy*) is a condition in which sudden and unusually severe bleeding occurs into the substance of the pancreas, and frequently into the surrounding tissues and organs. The bleeding may be in any part of the gland and the effusion of blood may remain circumscribed or may cause great distention of the entire organ and infiltrate both glandular tubules and surrounding looser connective tissue and capsule. The mass is dark red in color and is usually rather soft in consistency. If the patient has been able to survive the attack for a few days, evidences of inflammation and absorption will make their appearance.

Small hemorrhages may be produced in the course of infectious or eruptive diseases, in degenerative conditions of the blood-vessels (*Atheroma*), in hemophilia, from mechanical injuries, tumors of the glands, or from the severe passive congestions associated with some of the heart lesions. These causes, however, do not seem to play any part in the production of the severe hemorrhages which are usually described by the term 'Pancreatic Apoplexy.' While it seems probable that these cases are brought about by some undefined action of the secretion of the gland itself, still it must be admitted that the mechanism and chemistry of the condition are still unknown.

The disease is apt to affect persons in apparently perfect health and is of some importance from a medico-legal aspect, on account of the suddenness with which death may occur.

The onset is usually sudden and alarming, beginning with violent epigastric pains and collapse. A feeling of pressure in the region of the stomach, with nausea and vomiting follows. The pulse becomes rapid and small, the lips blanched, the skin white and moist, dyspnea may occur, and the patient gasp for breath, on account of loss of blood.

The temperature is usually low, but in case the patient survives for a day or two it may rise. Death usually occurs during the first day and is to be ascribed more to cardiac paralysis from reflex action through the solar plexus, than to actual loss of blood.

Treatment must seek to enforce absolute quiet, relieve the pain, and counteract the great prostration, as well as to stop the hemorrhage. Surgical interference, if instituted at once, may save life by relieving the pressure as well as by arresting the hemorrhage.

Acute pancreatitis is an inflammation of the pancreas, which is frequently associated with some of the infectious diseases. It is distinguished from pancreatic apoplexy by the fact that any hemorrhage which may occur comes as a result of the active congestion of the inflammatory process, whereas in the latter condition the hemorrhage is apparently without immediate cause.

Not all cases of acute pancreatitis, however, are associated with extensive hemorrhage. The inflammatory processes are characterized by swelling of epithelium, parenchymatous degeneration, and considerable round-cell infiltration into the interstitial substance. The surrounding peritoneum and adjacent structures may also be affected. A peculiar condition frequently found associated with acute pancreatitis is known as 'fat necrosis' which consists of a degeneration of small areas of fat, usually scattered through the omentum and mesentery, and varying in size from the head of a pin up to a pea or larger. It is probable that this fat necrosis results from an absorption or diffusion of pancreatic secretion. The disease is met frequently in men past middle age and seems to be often associated with chronic inflammation of the duodenum or gall-bladder. The symptoms are similar to those described under pancreatic apoplexy, except that fever is usually associated with the process and that the onset may be a little less rapid and the duration longer. Fatty diarrhea and tympanites are frequent and the urine may contain both albumin and sugar.

The treatment is symptomatic throughout and it is well to supply, with the food, pancreatin in five grain doses or more to replace that which should have been produced by the gland.

Suppurative pancreatitis (Septic pancreatitis, Pancreatic abscess) is a condition in which the formation of pus is occurring in the pancreas, either as a single large pocket or in diffused multiple small areas. Infection may come through the lymphatics or blood-vessels as a part of a septicemia or as a part of a more or less diffuse infection in the neighborhood. Probably, however, the majority of the cases receive their infection through the pancreatic duct from the intestinal tract. Following the suppuration in the pancreas, the liver or surrounding tissues may be involved or a general sepsis may occur. Among the predisposing cause may be named, intemperance, chronic digestive disturbances, gallstones,

and pancreatic calculi. The symptoms vary according as to whether the process tends to be more acute or chronic. The disease affects especially men in middle life.

The epigastric pains, vomiting, tympany, and prostration recall the symptoms found in acute pancreatitis, and in addition, chills and a typical irregular septic temperature will be found. If the disease has continued a few days or longer, leucocytosis will be present, and the organ may be sufficiently enlarged to be palpable, especially if there is a single large abscess.

The treatment is symptomatic and surgical, most cases however terminating fatally.

Gangrenous Pancreatitis (Gangrene of the Pancreas) occurs occasionally and may last for several weeks. It may follow hemorrhagic pancreatitis, traumatism, or the infection resulting from perforation of the stomach, intestine, or bile-tracts. The organ is dark in color, evil smelling and may be badly disintegrated, or largely converted into a putrid fluid mass. The remains of the gland may be discharged into the peritoneal cavity or into the intestine. Fat necrosis is usual and thrombophlebitis of the spleen is common. The symptoms are similar to those of hemorrhagic panereatitis, but the course is usually more prolonged. The disease is usually fatal, but recovery has occurred when the remnants of the organ have been discharged through the intestine or when surgical intervention has been successfully instituted.

Pancreatic Calculi (Stone in the Pancreas) are occasionally encountered. The condition is extremely rare and seems to follow slight inflammation of the organ or some obstruction in the pancreatic ducts; the calculi vary in size from fine sand to the size of a filbert or larger. The irritation produced may lead to the formation of cysts, abscesses, atrophy of the organ, if the irritation is long continued it may possibly act as a predisposing cause of cancer. In some cases the cysts or abscess formations have discharged into the peritoneal cavity or gastrointestinal tract.

The symptoms vary somewhat with the course the disease is taking. If suppuration occurs or cysts are formed the general symptoms are such as have been described under these headings, and vary in intensity with the severity of the process and area involved. If the calculi attempt to pass through the panereatic duct, paroxsymal seizures of pain resembling attacks of gallstone colic occur (panereatic colie). The location of the pain, fatty diarrhea, and the presence of sugar in the urine help to clear up the diagnosis which may be strengthened by the subsequent finding of the calculi, consisting largely of calcium carbonate, in the stools.

The treatment consists in relieving the extreme pain and in surgical intervention.

Pancreatic Cysts may be single or multiple and may vary from the size of a pea tc a bag with a capacity of

several gallons. The fluid may be light colored or dark brown and mixed with blood. Cysts are usually due to obstruction of the pancreatic duct either by calculi within or by pressure from without, as from tumors or the formation of inflammatory fibrous tissue. There may be no symptoms for a considerable time or pain of varying intensity may make its appearance. Fatty diarrhea, albuminuria, and glycosuria occur usually if the pancreatic secretion is prevented from reaching the intestines. When the cysts are large jaundice may make its appearance and ascites and intestinal hemorrhage be produced. A feeling of weight or pressure is experienced, and in some cases excessive secretion of saliva is produced (pancreatic salivation). When the cysts attain sufficient size they can be recognized by physical examination.

The treatment is surgical and offers a very good chance of recovery.

Tumors of the Pancreas. The principal tumors found in the pancreas are Carcinoma (Cancer), Sarcoma, Adenoma, and Lymphoma. Of these carcinoma is the most frequent and important. It is usually primary but may be secondary to other cancers in the neighborhood. It occurs most frequently in men past middle life.

The symptoms develop very gradually, with digestive disturbances, loss of weight and strength, and cachexia. Later pain in the region of the organ develops which is frequently more marked at night. Fat and occasionally traces of blood are found in the stools and glycosuria is usual. When the tumor has progressed sufficiently to obstruct the neighboring common bile-duct, jaundice occurs which is usually extreme. When the tumor grows so that it presses upon the large abdominal blood-vessels (vena cava and aorta) ascites develops and the pulsation is transmitted to the tumor; in other cases intestinal obstruction may be caused. The course of the disease is progressive until death occurs from inanition or intercurrent mechanical disturbances. The treatment would be surgical were it possible to make a diagnosis sufficiently early, but as this is usually impracticable, recourse must usually be had to supportive treatment, relief of the pain by opiates, and the meeting of intercurrent symptoms as they arise. The course of the disease may be retarded materially in some cases by the judicious application of the X-ray.

PANCREATIN: a substance secreted by the pancreas, and often administered, in medicine, for the correction of certain digestive disorders. One of its normal components, steapsin, is an exceedingly powerful agent for effecting the emulsification of fats. Another constituent, trypsin, converts coagulated albuminous substances into soluble peptones. Another, amylopsin, converts starches and other amylaceous substances into sugars; and a fourth can coagulate the casein of milk.

PANDA, *păn'dâ* (*Ailurus fulgens*): quadruped of the family *Ursidæ* (see BEAR), native of the Himalayas; the

only known species of its genus, having a very short muzzle, small, rounded ears, a moderately long tail, and semi-retractile claws: it is covered with long hair, and is about the size of a large cat. It dwells chiefly in trees, preying much on birds, but it eats also small quadrupeds and large insects. It has a thick, fine, woolly covering, adapting it to a cold climate, concealed by long, soft, glistening, and richly colored hair, mostly chestnut-brown, which passes into black on the sides and legs, and into white on the head. The P. is said to excel all other animals in the brilliancy of its fur, which, however, has not yet acquired commercial value. The soles of the feet are thickly covered with woolly hair. The P. is called also *Wah* and *Chit-wa*, from its peculiar cry.

PANDANUS, n. *păn-dā′nŭs* [Mal. *pandang*, conspicuous]: genus of plants, whose species are remarkable for their aerial roots, with large cup-like spongioles; ord. *Pandanācĕæ*, or Screw Pine family. *P. Veitch′ĭī* is a greenhouse plant, having light-green leaves, banded and striped with pure white. PANDANACEÆ, *păn-da-nā′sē-ē*, natural order of endogenous plants, constituting a remarkable feature in the scenery of many tropical countries, but unknown in colder regions. They are trees or bushes, often sending down adventitious roots, sometimes weak and decumbent, or climbing. There are two sections of the order—one (*Pandaneæ*) including the genera *Pandanus*, *Freycinetia*, etc., having long, simple, imbricated leaves, usually spiny on the back and margin, their base embracing the stem, their spiral arrangement often notably visible; the other (*Cyclantheæ*) containing the genera *Cyclanthus*, *Nipa* (q.v.), *Carludovica*, *Phytelephas*, etc., having pinnate or fan-shaped leaves, and in general appearance resembling palms, with which they have been often ranked. The two sections are very similar in flowers and fruit, in which they resemble the humbler *Araceæ* and *Typhaceæ*. The flowers are mostly unisexual, naked, or with only a few scales, arranged on a spadix, and wholly covering it. The stamens are numerous; the ovaries usually clustered, one-celled, each crowned with a stigma: the fruit consists of fibrous, one-seeded drupes, collected or almost combined, or of berries with many seeds.—There are about 100 known species. Some are valuable for the fibre of their leaves, some for their edible fruit, etc. See SCREW PINE: KIEKIE: NIPA. The unexpanded leaves of *Carludovica palmata* furnish the material of which *Panama hats* are made. The tree which yields VEGETABLE IVORY (q.v.) is another of the palm-like section of this order.

PANDAR: correct but not usual spelling of PANDER (q.v.).

PAN'D'AVAS (descendants of Pân'd'u): in anc. Hindu myth., the five princes whose contest for regal supremacy with their cousins, the Kurus, sons of Dhr'itarâsht'ra, forms the foundation of the narrative of the great epic poem the *Mahâbhârata* (q.v.). Their names are *Yudhisht'hira*, *Bhîma*, *Arjuna*, *Nakula*, *and Sahadeva*—the former three being sons of Pân'd'u (q.v.) by one of his wives, Pr'ithâ; and the latter two by his other wife, Mâdrî. But though Pân'd'u is thus the recognized father of these princes, the legend of the *Mahâbhârata* presents him as their father merely by courtesy; for it relates that Yudhisht'hira was son of Dharma, god of justice; Bhîma, of Vâyu, god of wind; Arjuna, of Indra, god of the firmament; and Nakula and Sahadeva, of the As'wins, twin-sons of the sun.

PANDEAN, a. *păn-dē'ăn:* pertaining to *Pan*, god of shepherds. PANDEAN PIPES, musical wind instrument of pipes or reeds fastened side by side.

PANDECT, n. *păn'dĕkt* [L. *pandectæ;* Gr. *pandektēs*, a book that contains everything—from Gr. *pan*, all; *dech'omai*, I take or receive]: treatise containing the whole of any science. THE PANDECTS, plu., celebrated collection or digest of Roman laws made by order of the Roman emperor Justinian (q.v.); called also *Digestum* or Digest. It was an attempt to form a complete system of law from the authoritative commentaries of the jurists on the laws of Rome. The compilation of the Pandects was undertaken after that great collection of the laws themselves known as the Codex Justinianeus. It was intrusted to the celebrated Tribonianus, who had distinguished himself in the preparation of the Codex. Tribonianus formed a commission of 17 members, who were occupied A.D. 530–533 in examining, selecting, compressing, and systematizing the authorities, comprising more than 2,000 treatises, whose interpretation of the ancient laws of Rome was from that time to bear the authority of law. Ten years had been allowed for their work; but so diligent were they, that it was completed in less than one-third of the time; and an idea of its extent is given by the fact that it contains more than 9,000 separate extracts, selected according to subjects from the 2,000 treatises referred to above.

The Pandects are divided into 50 Books; also into 7 Parts, which correspond respectively with Books 1–4, 5–11, 12–19, 20–27, 28–35, 36–44, 45–50. The division into Parts is seldom attended to in citations. Each Book is sub-divided into Titles, under which are arranged the extracts from the 39 jurists, who are by some called the classical jurists, though other writers on Roman law confine that appellation to five of the number: Papinian, Paulus, Ulpian, Gaius (q.v.), and Modestinus. The extracts from these indeed constitute the bulk of the collection; those from Ulpian alone making one-third of the whole work, those from Paulus one-sixth, those from Papinian one-twelfth. Other

writers besides these 39 are cited indirectly, i.e., when cited by the jurists whose works form the basis of the collection. The principle on which the internal arrangement of the extracts from individual writers was made was long a subject of controversy, but seems now satisfactorily solved. The execution of the work, though not free from repetition (the same extracts occurring under different heads), and from occasional inaptness of citation, and other inconsistencies, yet deserves the very highest commendation. In its relations to the history and literature of ancient Rome, it is invaluable; and taken with its necessary complement, the Codex, it may justly be regarded (having been the basis of all the mediæval legislation) as of the utmost value to the study not only of Roman but of all European law.

PANDEMIC, a. *păn-dĕm′ĭk* [Gr. *pan*, all; *dēmos*, the people]: incident to a whole people; epidemic.

PANDEMONIUM, n. *păn′dĕ-mō′nĭ-ŭm* [Gr. *pan*, all; *daimōn*, a demon]: a general temple for the evil spirits; 'the high capital of Satan and his peers;' hell; a bear-garden of disorder.

PANDER, or PANDAR, v. *păn′dėr* [from *Pandărus*, who performs the part of a *pander* in the story of Troilus and Cressida]: to act as agent in gratifying the passions or appetites of others; to minister to the passions or prejudices of others for selfish ends, as, he *panders* to the prejudices of the crowd: N. one who caters for the lusts of others; a pimp; a procurer. PAN′DERING, imp. PAN′DERED, pp. *-dėrd*. PAN′DERLY, a. *-lĭ*, in *OE.*, acting like pimps.

PANDICULATED, a. *păn-dĭk′ū-lā′tĕd* [L. *pandic′ulātus*, stretched out; *pandic′ulārī*, to stretch one's self]: stretched out; yawning. PANDIC′ULA′TION, n. *-lā′shŭn*, the restlessness and stretching that accompanies the ague; yawning.

PANDIT, n. *păn′dĭt*, or PUNDIT, n. *pŭn′dĭt* [Hind. *pandit;* Skr. *pandita*, a learned man]: a learned Brahmin.

PANDORA, n. *păn-dō′ră* [L. and Gr. *Pandōră*—from Gr. *pan*, all; *dōron*, a gift]: according to the ancient Grecian myth, was the first woman on the earth. When Prometheus had stolen fire from Jupiter, Zeus instigated Hephæstus to make woman out of earth, to bring vexation upon man by her graces. All the gods and goddesses bestowed gifts requisite to endow her for this purpose—beauty, boldness, cunning, etc.; and Zeus sent her to Epimetheus, brother of Prometheus, who forgot his brother's warning against receiving any gift from Zeus. PANDORA'S BOX, according to a later form of the myth, was a vessel or box possessed by Pandora, filled with winged blessings, which mankind would have continued to enjoy if curiosity had not prompted her to open it, when all the blessings flew out and disappeared, except Hope, which was detained when in terror the cover was hastily replaced.

PANDORE, n. *păn′dōr* [Gr. *pandoú′ra;* F. *mandore*]: a musical instrument of the lute kind; commonly spelled *bandore*.

PANDORES, n. plu. *păn′dōrz*, or PANDORE OYSTERS [Scot. *pan-doors*, large oysters caught near the *doors* of the *salt-pans* at Prestonpans, on the Firth of Forth]: variety of oysters highly esteemed.

PANDOURS, n. plu. *păn-dôrz′:* obsolete name for the Hungarian light infantry. The P. originally were a people of Servian origin who lived scattered among the mountains of Hungary, near the village of Pandour, in the county of Sohl; and their name was applied to that portion of the light-armed infantry in the Austrian service raised in the Slavonian districts on the Turkish frontier. The P. fought originally under the orders of their own proper chief, called Harûn-Basha; and they rendered essential service to the Austrians during the Spanish War of Succession, and afterward in the Seven Years' War. They fought after the fashion of the 'free lances,' and were a terror to the enemy by their incessant annoyance. Their appearance was exceedingly picturesque, being somewhat oriental; and their arms consisted of a musket, pistols, a Hungarian sabre, and two Turkish poniards. Their habits of brigandage and cruelty rendered them, however, as much a terror to the people whom they defended as to the enemy. Since 1750 they have been gradually put under stricter discipline, and are now incorporated with the Austrian frontier regiments.

PANDOWDY, n. *păn-dow′dĭ* [etym. doubtful]: pudding made of bread and apples baked together.

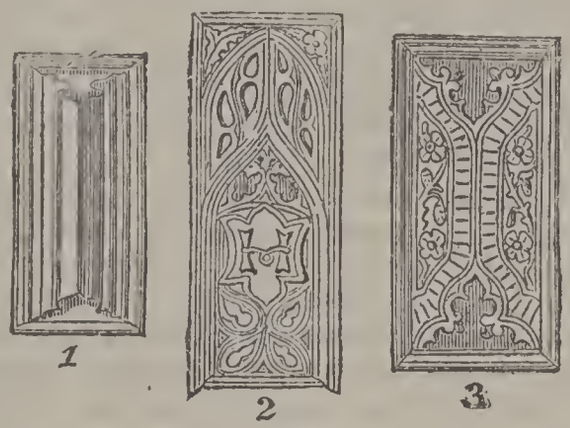
PÂN′D′U (literally, 'white'): in anc. Hindu myth., father of the Pân′d′avas (q.v.), and brother of Dhr′ita-râsht′ra. Although the elder of the two princes, he was rendered by his 'pallor'—implying, perhaps, a kind of disease—incapable of succession, and therefore obliged to relinquish his claim to his brother. He retired to the Himalaya Mountains, where his sons were born, and where he died. His renunciation of the throne became thus the cause of contest between the Pân′d′avas, his sons, and the Kurus, or the sons of Dhr′itarâsht′ra.

PANDURIFORM, a. *păn-dū′rĭ-fawrm*, or PANDURATE, a. *păn′dū-rāt* [Gr. *pandoura*, a musical instrument with three strings; L. *forma*, a shape]: in *bot.*, applied to the leaves of plants shaped like a fiddle.

PANE, n. *pān* [F. *pan*, a pane, the flap of a coat: Port. *pano*, a piece of cloth: L. *pannus*, a cloth, a rug]: a square of glass for a window; a piece of anything, as cloth, in variegated work. PANED, a. *pānd*, composed of small squares. PANE′LESS, a. without panes.

PANEGYRIC, n. *păn'ĕ-jĭr'ĭk* [L. *panegyr'icus;* **Gr.** *panēgur'ĭkos*, of or belonging to a public assembly—from Gr. *pan*, all; *aguris*, *agora*, a gathering, a crowd: F. *panégyrique*]: an oration or discourse in praise of some person; praise; eulogy; encomium. PAN'EGYR'IC, a., or PAN'EGYR'ICAL, a. *-ĭ-kăl*, containing praise or eulogy. PAN'EGYR'ICALLY, ad. *-lĭ*. PANEGYRIZE, v. *păn'ĕ-jĭr-īz*, to praise highly; to write or pronounce a eulogy on. PAN'EGYRI'ZING, imp. PAN'EGYRIZED', pp. *-īzd'*. PAN'EGYR'IST, n. *-jĭr'ĭst*, one who bestows praise; a eulogist.

PANEL (formerly, PANNEL), n. *păn'ĕl* [OF. *panel;* F *panneau*, a panel or little pan of wainscot, or of a saddle—from mid. L. *panellus*—from L. *pannus*, a cloth: a dim. of Eng. *pane*]: *literally*, a square piece of wood, cloth, or parchment—thus a saddle-cloth, or a pad used as a saddle; piece of thinner boarding inserted into a strong frame, as in a door; space or compartment of a wall,



Panels.

wainscot, ceiling, woodwork, etc., inclosed by beams, moldings, framing, etc.; generally sunk under the plane of the surrounding stiles. Panels are sometimes highly ornamented with tracery, shields, etc. In late Gothic architecture, the P. is very often carved into the 'linen pattern.' Panelling is an ornament frequent in Elizabethan architecture: the ceilings and walls are covered with it, and every piece of furniture is cut into panels of every variety of form. Panels are said to be 'fielded' when the centre of the panel is raised with moldings, etc.—The term P. is applied also in milit. to a carriage for transportation of a mortar and its bed.

PAN'EL (properly, the slip or 'pane' of parchment on which the names of jurors are written), in *law*, the body of persons summoned to sit on a jury, or the set of jurors as selected for trial of a cause, civil or criminal. In Scotch criminal law, the prisoner is usually called the panel. PANEL, v. to form or furnish with panels. PAN'ELLING, or PAN'ELING, imp. PAN'ELLED, or PAN'ELED, pp. *-ĕld*. IMPANELLING (or IMPANELING) A JURY, entering their names in a panel or schedule of parchment

PANG, n. *păng* [prov. F. *poigne*, a grip, the strength exerted by the wrist—from L. *pugnum*, the fist: OF. *poinct*, a stitch or sharp pain in the side]: a paroxysm of extreme pain or anguish, either physical or mental; agony; great distress or suffering: V. in *OE.*, to torment cruelly. PANG'ING, imp. PANGED, pp. *păngd*.—SYN. of 'pang': pain; anguish; agony; suffering; distress; throe.

PAN'GE, LIN'GUA [L. 'Proclaim, O Tongue']: one of the most remarkable of the hymns of the Roman Breviary, and like its kindred hymn, *Lauda Sion*, a most characteristic example as well of the mediæval Latin versification as of that union of theology with asceticism which a large class of these hymns present. The P. L. is a hymn in honor of the Eucharist, and belongs to the service of the Festival of Corpus Christi. It is from the pen of the great 'angelic doctor,' Thomas Aquinas (q.v.), and consists of six strophes or verses in alternate rhyme. Besides its place in the office of the Breviary, this hymn forms part of the service called Benediction with the Blessed Sacrament, and is sung on all occasions of the exposition, procession, and other public acts of eucharistic worship.

PANGENESIS, n. *păn-jĕn'ĕ-sĭs* [Gr. *pan*, all; *genĕsis*, origin, source—from *gen'naō*, I beget, I produce]: theory which teaches that every atom or cell or gemmule of the body resides in the blood, and reproduces itself, and that the framework of the body itself is little else than a case inclosing such elements, and formed by their development. PANGENETIC, a. *păn'jĕ-nĕt'ĭk*, pertaining to pangenesis.

PANGOLIN, n. *păn'gō-lĭn* [Mal. *panggiling*]: the scaly ant-eater. P. is a name sometimes extended to all the species of *Manis* (q.v.), but originally belonging to *M. pentadactyla*, called also SHORT-TAILED MANIS, and in some parts of India BAJJERKEIT; this species being a native of most parts of the E. Indies, and P., its Malayan name, from a word which signifies to roll up; the animal

Pangolin (*Manis pentadactyla*).

having the habit of rolling itself up, on apprehension of danger, into a compact ball, the head in the centre, and its muscular mail-covered tail enfolding all. The food

of the P. consists chiefly of ants, and, like the rest of the genus, it is entirely destitute of teeth, and has a round, extensile tongue. Its claws are long and strong; it doubles them up like the American ant-eaters when it walks. It resides in burrows, which it excavates to the depth of seven or eight ft. in the ground. It is capable of climbing trees, and the tail is prehensile. The whole length of the animal, including the tail, is almost five ft., the tail not quite half the length of the body. It is a gentle animal, easily tamed, and affectionate.

PAN-HELLENIC, a. *păn'-hĕl-lĕn'ĭk* [Gr. *pan*, all; *Hellēnes*, the Greeks]: pertaining to all Greece. PAN-HEL'LENISM, n. *-ĭzm*, scheme for forming all the Greeks into one political and united body. PAN-HEL'LENIST, n. *-ĭst*, one in favor of Pan-Hellenism.

PANIC, n. *păn'ĭk* [L. *panĭcum*, Italian panic-grass: It. *panico;* F. *panic*]: kind of millet, called also PANIC-GRASS; millet is *Panĭcum milĭācĕum*, ord. *Graminācĕæ:* see MILLET.

PANIC, n. *păn'ĭk* [Gr. *panĭkos*, influenced by the god *Pan*—Pan is said to have assisted the Athenians at Marathon by inspiring the enemy with a causeless fear (see PAN); It. *panico;* F. *panique*, panic or fear]: sudden fright, particularly without cause; terror inspired by a trifling cause; a sudden alarm; a monetary crisis: ADJ. extreme or sudden, but groundless. PANIC-STRUCK, a. inspired with terror without cause or on slight cause.—*Panic* is a condition in which fear, whether from an adequate or inadequate cause obtains mastery over every other consideration and motive, and urges to dastard extravagance, or hurries into danger or death. An inexplicable sound causes a rush from a crowded public building, a vague report in the money market or a business mart causes a run on a bank: acts that precipitate the very events that are dreaded. This emotion either differs from natural apprehension, or presents so intense and uncontrollable a form of the feeling that it is instantly propagable from one person to another, and involves alike the educated and ignorant—those who act from judgment as well as those who act from impulse. There are, besides this feature, several grounds for believing that such manifestations of involuntary terror are of morbid origin, and should be regarded as moral epidemics. They have generally arisen during, or have followed, seasons of scarcity and physical want and disease, the ravages of war, or periods of great religious fervor and superstition; or, on the other hand, they have supervened as the reaction from excessive over-confidence. The dancing mania, the retreat of the French army from Moscow, and recent and familiar commercial panics afford illustrations of certain of these relations. The most notable instance of universal panic, and aptly indicating an alliance of panic with mania, is the dread of the approaching end of the world which pervaded all minds and al-

most broke up human society in the 10th c. The empire of Charlemagne had fallen to pieces; public misfortune and civil discord merged into misery and famine so extreme that cannibalism prevailed even in Paris; superstitious and vague predictions became formalized into a prophecy of the end of all things and universal doom in the year 1,000. This expectation suspended even vengeance and war. The 'truce of God' was proclaimed. Enormous riches were placed upon the altars. Worship and praise never ceased. The fields were left uncultivated; serfs were set free; four kings and thousands of nobles retired to the cloister; and all men, according to their various tendencies, prepared to die.—It is worthy of note that during all pestilences there have arisen epidemic terrors, not so much of the devastations of disease, as of plots and poisonings by the rich against the poor. Even where these epidemic terrors are legitimately traceable to local and physical causes, as in the case of the singular affection timoria, in the marshy and unhealthful districts in Sardinia, the tremor and trepidation, and other phenomena, are ascribed to the magical influence of enemies.

A modern form of panic is the alarm that spreads through stock-markets and exchanges in periods of financial crisis. The crisis of the late autumn of 1890, in London, was brought on by overspeculation in the Argentine stocks. Crises in the financial world, accompanied by 'panics,' occurred in 1763,83,93,97, 1825,37,47,57,64,69,73,93. Two days of panic are memorable in New York as 'Black Friday,' 1869, Sept. 24, 1873, Sept. 18. A financial panic occurred in New York City 1907, October. Confidence in the management of some of the banks had been impaired, and in several instances the reserves were found to be below legal requirements. Runs on several institutions followed and a number were forced to suspend, but some subsequently resumed.

PANICLE, n. *păn'ĭ-kl* [L. *panic'ula*, a tuft on plants: It. *panicule*]: in *botany*, a mode of Inflorescence (q.v.) in which the floral axis is not only divided, but also subdivided more or less frequently. It is in form a tuft or bunch of flowers or seeds, either dense or close as in Indian corn, or spreading and scattered as in oats; or in other forms: the down on reeds is a panicle. The panicle may thus be regarded as a Raceme (q.v.) of which the branches (or flower-stalks) are branched. The panicle is a very common kind of inflorescence. Most of the grasses exhibit it, and many other plants, both endogenous and exogenous. The common lilac affords a good example. The panicle, variously modified as to form and arrangement and relative lengths of its branches and branchlets, becomes a Cyme (q.v.), Thyrsus (q.v.), etc. PANICLED, a. *păn'ĭ-kld*, furnished with panicles. PANICULATE, a. *pă-nĭk'ū-lāt*, or PANIC'ULATED, a. having branches variously subdivided; having the flowers in panicles. PANICULATELY BRANCHED, loosely branched.

PANIFICATION, n. *păn'ĭ-fĭ-kā'shŭn* [L. *panis*, bread, *facĭō*, I make]: the changes by which the dough is converted into bread. PANIVOROUS, a. *pă-nĭv'ō-rŭs* [L. *voro*, I devour]: eating bread; subsisting on bread.

PÂNINI, *pâ-nē'nē* or *pâ'nĭ-nĭ*: greatest known grammarian of anc. India, whose work on the Sanskrit language has to the present day remained the standard of Sanskrit grammar. It is, so far as is known, the oldest grammar of the human race. Its merits are so great that P. was ranked among the R'ishis (q.v.), or inspired seers, and at a later period of Sanskrit literature was supposed to have received the fundamental rules of his work from the god S'iva himself. Of the personal history of P., nothing positive is known, except that he was a native of the village S'alâtura, n.w. of Attock, on the Indus—whence he is also surnamed S'âlâturîya—and that his mother was called Dâkshî, wherefore, on his mother's side, he must have been a descendant of the celebrated family of Daksha. The account in the tale-book *Kathâs aritsâgara* (12th c.) is absurd and worthless. According to the views expressed by Goldstücker (*Pân'ini: His Place in Sanskrit Literature*, London 1861), it is probable that P. lived before Sâ'kyamuni, founder of the Buddhist religion (d. about B. C. 543).—The grammar of P. consists of eight Adhyâyas, or books, each book comprising four Pâdas, or chapters, and each chapter a number of Sûtras (q.v.), or aphoristical rules: in all, the rules number 3,996; but three or four did not belong to the work of Pân'ini. The arrangement of these rules differs completely from what a European would expect in a grammatical work, for it is based on the principle of tracing linguistic *phenomena*, and not concerned in the classification of the linguistic *material*, according to the so-called parts of speech. The rules of conjugation, declension, etc., are therefore not found in the same chapter or in the same order as in European grammars. In general, P.'s work may therefore be called a natural history of the Sanskrit language, giving description of facts, instead of making such a description subservient to linguistic theories. This makes it peculiarly instructive to the European student, as it accustoms his mind to survey language from an unusual point, and induces him to question the soundness of many linguistic theories now deemed axiomatic. As the method of P. requires the combining of many rules scattered through the work, and many inferences from these rules, it exercises on the mind an effect analogous to the peculiar advantage of the study of mathematics. The rules of P. were criticised and completed by Kâtyâyana (q.v.), who probably was the teacher of Patanjali; and he in turn was criticised by Patanjali (q.v.), who sides frequently with Pân'ini. These three authors are the canonical triad of the grammarians of India; and their works are, in truth, remarkable for literary merit above nearly all grammatical productions of other nations. The best existing commentary on the rules of P. is the

Kâs'ikâvr'itti, by Vâmana Jayâditya. Later, attempts were made to arrange the rules of P. in a manner approaching the European; the chief work of this category is the *Siddhânta-Kaumudî*, by Bhat't'oji-dîkshita. P. mentions, in his Sûtras, several grammarians who preceded him—among others, S'âkatâyana; and as MSS. of a grammar ascribed to a grammarian of this name are in the library of the India office in London and in the library of the board of examiners at Madras, some have recently attempted to prove this grammar the one referred to by P., therefore older than his work. But the proof of this hypothesis is ludicrously weak; and the evidence for the comparatively recent date of this work is incontrovertible. The Pûtras of P., with a modern commentary by two native pandits, and with extracts from the *Vârttikas* of Kâtyâyana and the *Mahâbhâshya* of Pantanjali, were edited at Calcutta 1809. This ed., with the modern commentary, but with garbled extracts from the extracts mentioned, was reprinted at Bonn 1839–40 by Dr. O. Boehtlingk, with some indexes. —For the literature connected with P., see Colebrooke's preface to his *Grammar of the Sanskrit Language* (Calc. 1805), and Goldstücker's *Pân'ini*, etc., mentioned above.

PANIPUT, *păn-ĭ-pŭt'* or *pâ-nē-pŭt':* chief town of the dist. Kurnál, division of Delhi, Punjab, India; 54 m. (by road, 78 m.) n. by w. from Delhi; in a fertile tract, whose resources are largely developed by artificial irrigation. Pop. about 25,000. Being a station on the great military road between Afghanistan and the Punjab, and to some extent an outpost of Delhi, it has been the scene of strife between the inhabitants of India and invaders. The *first* great battle of P. was in 1526, and gained by Mirza Baber, ex-ruler of Ferghana, at the head of 12,000 Mongols, over Ibrahim, emperor of Delhi, whose unwarlike array numbered 100,000 men, with 1,000 elephants. This victory seated Baber on the throne of Hindustan as the first of the 'Great Mogul' dynasty. The *second* great battle was in 1556, by the Mongols under Akbar, grandson of Baber and third of the Mogul emperors, against Hemu, an Indian prince who had usurped the throne of Delhi. Hemu's army was defeated with great slaughter, and he was slain. The *third* battle was 1761, Jan. 14, between Ahmed Abdalli, ruler of Afghanistan, and the till then invincible Mahrattas. The Játs, who had been forced to join the Mahrattas, deserted to the Afghans at a time when victory seemed to be declaring for the former; and this act of treachery, with the loss of their leaders, threw the Mahrattas into confusion, and in spite of their resolute valor they suffered total defeat. They left 50,000 slain on the field of battle, including all their leaders except Holkar, and 30,000 more were killed in the pursuit, which continued four days. The Mahrattas never recovered from this crushing blow. At Kurnaul, a town n. of P., Nadir Shah of Persia, 1739, won the the famous battle over the Mogul emperor, which placed n.w. India at his feet.

PANISLAMISM, n. *păn-ĭz'lam-ĭzm* [prefix *pan-; Islamism*]: theory and scheme of a union or confederacy of all Mohammedan nations, to enable them to resume their efforts for the conquest of the world.

PANIZZI, *pâ-nĭt'sē* or *-nēt'sē*, Sir ANTONIO: 1797, Sep. 16—1879, Apr. 8; b. Brescello, in the *ci-devant* duchy of Modena: principal librarian of the Brit. Museum 1856–66. For his education he was sent first to the public school of Reggio; afterward to the Univ. of Padua, where 1818, he took the degree doctor of laws, with a view to practicing at the bar. When, 1821, the popular revolution broke out in Piedmont, the young advocate became one of its leaders. The attempt failed; and P. was arrested at Cremona, but escaped, took refuge in Lugano, and thence found his way to Geneva. Meanwhile, during his absence, he was tried at home *per contumaciam*, as it is called, and sentenced to death, with confiscation of property. The governments of Austria and Sardinia demanded from the Swiss Confederation the expulsion of all concerned in the recent outbreak, and P. was compelled to leave Geneva. Forbidden to pass through France, he reached England by way of Germany and the Netherlands, and after about a month in London, went to Liverpool with an introduction from Ugo Foscolo to Roscoe the historian, who received him with utmost hospitality, and introduced him into the best circles. At Liverpool P. taught Italian, and continued in that town until 1828, when he came to London again, and was chosen prof. of Italian in the Univ. of London, then recently opened for students. In 1831, through the instrumentality of Lord Brougham, he was appointed one of the assistant librarians of the Brit. Museum; and on the retirement of the Rev. Mr. Baber, 1837, keeper of the printed books, P. was appointed his successor. In the previous year there had been a parliamentary committee on the state of the British Museum, before which P. gave valuable evidence, also urging measures for improvement and augmentation of the library, which on becoming keeper, he was in a still better position to advocate. In 1838 he superintended the removal of the printed books from the old suite of rooms in Montague House to the new library; and in the same year, with some of his assistants, he drew up the well-known 91 rules for the formation of a new catalogue of the library. These rules were approved by the trustees, and the first vol. (comprising letter A) was printed and published 1841. No other vol. followed until the publication was resumed 1881; and P., before a royal commission of inquiry into the Museum 1847, justified the suspension of the printing until the whole catalogue should be finished; yet it is considered that a chief cause of the hindrance was improper interference by various officials with P.'s plans. In 1845 P. drew up an elaborate report of the deficiencies in the library, in consequence of which the trustees applied to the lords of the treasury for 'an annual

grant of £10,000 for some years to come, for the purchase of books of all descriptions.' This grant having been obtained, the library rapidly increased in numbers, to such a degree that 1849 the books amounted to 435,000, as compared with 235,000, the ascertained number in 1838. The number of vols. is now estimated at considerably more than 1,300,000, probably about 1,500,000. (See BRITISH MUSEUM.) On the resignation of Sir H. Ellis, 1856, Panizzi was appointed principal librarian. In a literary capacity, Panizzi is known by his editions of Boiardo's *Orlando Innamorato*, and Ariosto's *Orlando Furioso* (1830-34), the minor poems of Boiardo (1835), and reprints of the first four editions of the *Divina Commedia* (1858). His pamphlet, *Chi era Francesco da Bologna*, proved the identity of the typefounder employed by Aldus, also inventor of the well-known Aldine or Italic type, with the painter Francesco Francia. Panizzi wrote occasional articles for the reviews. He retired on a pension 1866, and received the order K.C.B. 1869. He had the friendship of many eminent men.—See L. Fagan's *Life of Sir A. Panizzi* (2 vols. 1880).

PANLOGISM, *păn-lō'gism* [Gr. *pan*, all and *logos*, reason]: a term applied most often to Hegel's philosophy as one in which thought is made co-extensive with reality.

PANNADE, n. *păn-nād'* [OF. *pannade*, the prancing of a horse]: a curvet or particular way of leaping of a horse.

PANNAGE, n. *păn'nāj* [mid. L. *pannāgĭŭm*, the right of feeding swine in a landlord's woods—from L. *pastum*, to feed: OF. *pasnage*, the money received by the lord for such feeding]: the food, as acorns, beech-nuts, etc., which swine pick up in the woods; the duty paid to the lord for such permission.

PANNAH, *pân'nâ*, or PUNNAH, *pŭn'nâ:* decayed town of India, district of Bundelcund, on the n.e. slope of a plateau, 115 m. s.w. of Allahabad. It was formerly a large, thriving, and well-built town; but whole streets are now desolate or tenanted only by monkeys, which, posted on the roof or at the windows, view the townspeople without fear. The palace of the rajah is a beautiful building, surmounted by elegant kiosks, but is in many places ruinous. The source of the former prosperity of Pannah was its rich diamond mines. Owing to the diminished value of the gem, however, and the increased tax on the produce of the mines, this industry has greatly declined. The diamonds are generally tinted with color; very few being of first water, or completely colorless. This town is the chief place of the territory of Pannah, which is bounded north by the Brit. dist. of Banda, and south by the Brit. dist. of Nerbudda. See BUNDELCUND.

PANNIER, n. *păn'nĭ-ėr* [F. *panier*, a basket—from mid. L. *panārĭŭm*, bread-basket—from L. *panis*, bread: Milan. *pane'ra;* It. *paniere*, a bread-basket]: a wicker-

basket; a basket slung across a horse or donkey for carrying light articles.

PANNIKEL, n. *păn'nĭ-kĕl* [dim. of *pan*, the skull, as in *brain-pan*]: in OE., the skull.

PANNIKIN, n. *păn nĭ-kĭn* [dim. of *pan*]: a small tin cup or mug; a sauce-pan for pap.

PANNONIA, *păn-nō'nĭ-â:* province of the anc. Roman empire, bounded n. and e. by the Danube, w. by the mountains of Noricum, and on the s. reaching a little way beyond the Save; and thus including part of modern Hungary, Slavonia, parts of Bosnia, of Croatia, and of Carniola, Styria, and Lower Austria. It received its name from the Pannonians, a race of doubtful origin, who at first dwelt in the country between the Dalmatian Mountains and the Save, in modern Bosnia, and afterward more to the s.e. in Moesia. The Roman arms were first turned against them and their neighbors, the Iapydes, by Augustus B.C. 35; and after the conquest of Segestica or Siscia (Siszek) he subdued them. An insurrection took place B.C. 12, which Tiberius crushed after a long struggle; and a more formidable one of the Dalmatians and Pannonians together, A.D. 6, which was suppressed by Tiberius and Germanicus, but not till after 2 years: 15 legions had to be assembled against the Pannonians, who mustered 200,000 warriors. Hereupon the Pannonians settled in the more northern countries, which received their name, and of which the former inhabitants, the Celtic Boii, had been in great part destroyed in Cæsar's time. The country was now formed into a Roman province, which was secured against the inroads of the Marcomanni and Quadi by the Danube, and on its other frontiers had a line of fortresses. Military roads were constructed by the conquerors, who also planted in the country many colonies and municipia, and thus gave it a rough coating of civilization. Great numbers of the Pannonian youth were drafted into the Roman legions, and proved, when disciplined, among the bravest and most effective soldiers in the imperial army. Pannonia was subsequently divided into Upper (or W.) and Lower (or E.) Pannonia, and under Galerius and Constantine underwent other changes. Upper Pannonia was the scene of the Marcomannic war in the 2d c. In the 5th c. the country was transferred from the W. to the E. Empire, and afterward given up to the Huns. After Attila's death, 453, the Ostrogoths obtained possession of it. The Longobards under Alboin made themselves masters of it 527, and relinquished it to the Avari upon commencing their expedition to Italy. Slavonian tribes also settled in the south. Charlemagne brought it under his sceptre. In the reigns of his successors, the Slavonians spread northward, and the country became a part of the great Moravian kingdom, till the Magyars or Hungarians took it in the end of the 9th c. In the time of the Romans,

Siscia (Siszek), Vindobona (Vienna), Carnuntum (near Haimburg), and Arrabo (Raab) were among its principal towns.

PANOPHOBIA, n. *păn'ō-fō'bĭ-ă* [Gr. *panĭkos*, panic; *phobos*, fear]: a kind of melancholy marked by constantly recurring groundless fear.

PANOPLY, n. *păn'ō-plĭ* [Gr. *panoplĭă*, full armor—from *pan*, all; *hopla*, armor]: complete armor; armament. PAN'OPLIED, a. *-plĭd*, completely armed.

PANOPTICON, n. *păn-ŏp'tĭ-kŏn* [Gr. *pan*, all; *optĭkos*, belonging to the sight—from *opsomai*, I shall see]: a name by which Jeremy Bentham designates his plan of a model prison; a species of polytechnic institution.

PANORAMA, n. *păn'ō-râ'mă* [Gr. *pan*, all; *hora'ma*, a sight or view]: properly, a pictorial representation of a whole surrounding landscape as seen from one point; but applied to any large painting placed on the inner surface of a cylindrical wall, representing extensive scenes and groups of objects, and exhibited part at a time, by being unrolled continuously before the spectator. PANORAMIC, a. *păn'ō-răm'ĭk*, pertaining to or resembling a panorama.—The *Panorama* was invented by Mr. Barker, an ingenious artist of Edinburgh. After inventing a new kind of perspective for the horizontal lines, he produced a panorama of Edinburgh, exhibited 1788. The first step in the construction of a panorama is to obtain sketches of the entire region to be represented; each sketch is a representation of a portion of the landscape in the form of a sector of a circle; with the sketcher's position as a center, and the horizon for circumference. The canvas to which the sketches are to be transferred is hung round the sides of a circular room, and forms the surface of a cylinder, on the inside of which the panorama is painted. The stage from which the picture is viewed is placed in the center of the room, about 30 ft. on every side from the picture; the picture itself is fastened above to a strong circular hoop, and, hanging down, has its lower edge fastened to a similar hoop, which is heavily weighted to keep the picture steady. The light is admitted by an aperture in the roof, which is concealed by an awning from the spectators on the stage. Notwithstanding important defects in the panorama, one of which is that the light more strongly illumines the upper than the lower parts of the picture—thus throwing the foreground comparatively into shade—many cases are on record of spectators being for the time completely under mental illusion. The most popular panorama ever executed was that of the Battle of Waterloo, the exhibition of which in England brought in £10,000.

PANOR'MUS. See PALERMO.

PANPIPE, n. *păn'pīp* [Eng. *pan* and *pipe*]: earliest form of a compound wind instrument, undoubtedly the precursor of the organ. It was the *suringx* of the Greeks,

fistula of the Romans, and probably the *ugab* of the Hebrews. It was formed of seven, eight, or nine short hollow reeds, fixed together by wax, and cut in graduated lengths so as to produce a musical scale. The lower ends of the reeds were closed, and the upper open and on a level, so that the mouth could easily pass from one pipe to another; called also Pan's pipes, Pandean pipes, and mouth-organ.

PANPSYCHISM [L. *pan* from Gr. παν combining form of πας (παντ-) all, and L. *Psyche* from Gr. ψυχή breath, spirit, soul, mind]: the doctrine that all beings in nature, even such beings as rocks and atoms of water or atmospheric gas, are endowed in their degree with consciousness. This view is not held by the ordinary man who sees no evidence that stones have thoughts or are sensitive to external influences. Yet even the ordinary thinker will be led in the direction of panpsychism, if he attempts to account for the sensitivity of such a plant as the pitcher plant which entraps its prey very much as the lower animals do, giving clear evidence of sensitivity to external stimuli. The degree and type of consciousness here assumed may be very low, but it seems related in character to animal sensitivity. If one becomes convinced that plants have sensitivity, the way is opened for the belief that all matter, since it is capable of entering into plant organisms or into higher organisms, is, even in its original inanimate condition, possessed of rudimentary forms of that sensitivity which is exhibited in higher plants and higher organisms. The doctrine of panpsychism thus expresses the belief that the most elementary forms of matter possess from the first the attribute of consciousness, which attribute appears in elaborate and highly organized forms in complex organisms.

PANSLAVISM, *păn-slâv'ĭzm* or *-slăv'ĭzm:* system, and recent movement toward accomplishing it, for the amalgamation of all races of Slavonic descent into one body, having one language, one literature, and one social polity. The movement is credited generally to Russian influence. The writings of Adam Gurowski and Kollar, and the anonymous pamphlet which appeared at Leipzig 1837, *Die Europæische Pentarchie* have had widespread influence in this direction among all the Slavonic people of the German states; and though the other nations of Europe have hitherto had no reason to anticipate any practical results from a movement toward Panslavism, the Slavonians of the Austrian empire have always taken occasion to show that they regarded themselves as standing apart from German interests in times of public disturbance. Thus, in 1848, instead of taking part with their fellow-citizens in the election of representatives to the German parliament at Frankfurt, the leading promoters of Panslavism summoned a Slavonic congress at Prague, which was attended by Slavonians from Bohemia, Moravia, and Silesia, and by Slavonic Poles,

Croats, Servians, and Dalmatians, who appeared in their national costumes. The impracticability of the grand schemes promulgated in the manifestoes of the conclave, had been sufficiently shown ere the congress was interrupted by a democratic rebellion, which was suppressed with much bloodshed. Since 1860, when questions of nationality began to come more into the foreground, Panslavism has exercised some direct influence on Austrian affairs; both northern and southern Slavs tending toward united action in opposition to the centralistic and dualistic aims of Germans and Magyars respectively. In 1867 a great Slavonic congress was held at Moscow without result. Panslavistic tendencies contributed to the great changes 1877-8 in the Balkan peninsula.

PANSTEREORAMA, n. *păn-stē'rĕ-ō-rȧ'mă* [Gr. *pan*, all; *sterĕŏs*, solid or hard; *hora'ma*, a sight or view]: a model of a town or country, showing all its parts or physical features in relief.

PANSY, n. *păn'zĭ* [F. *pensée*, thought—from *penser*, to think: L. *penso*, I weigh carefully]: a well-known plant highly esteemed for the beauty of its flowers; heart's ease; the *Vĭŏla trĭcŏlor*, ord. *Vĭŏlāccæ:* see VIOLET.

PANT, v. *pănt* [F. *pantelant*, gasping: OF. *pantiser*, to breathe often: prov. Eng. *pank*, to pant: prov. Sw. *pank*, exhausted: comp. L. *palpĭtārĕ*, to move frequently and quickly: an imitative word]: to breathe rapidly and violently, as from terror, after great exertion, or in anxious desire or suspense; to palpitate; to desire ardently. PANT, or PANT'ING, n. palpitation; rapid breathing. PANT'ING, imp. PANT'ED, pp. PANT'INGLY, ad. *-lĭ*. PANT'ER, n. *ĕr*, one who pants. PANT'ESS, n. *-ĕs*, difficulty of breathing in a hawk.

PANTÆNUS, *păn-tē'nŭs:* Christian teacher: period of active service from before A.D. 180 to about 202. Of his early life nothing is known; even his nationality is in dispute. For a time he was a stoic: but afterward embraced Christianity, and founded the famous catechetical school at Alexandria. His most distinguished pupil, who was also his successor in the school, was Clement (Clemens Alexandrinus). He engaged in missionary labors, and wrote several Scripture commentaries, nearly all of which have disappeared.

PANTAGRAPH, *păn'tă-grăf*. See PANTOGRAPH.

PANTALOON, n. *păn'tă-lôn'* [F. *pantalon*—from It. *pantalone*, a masked character in the Italian comedy who wore breeches and stockings all of one piece]: a buffoon in pantomimes. PAN'TALOONS, n. plu. *-lônz'*, long inside trousers extending to the heels; trousers. PANTALETS, n. plu. *păn'tă-lĕts*, loose drawers worn by women and children. *Note.*—The It. *pantalone* of the comedy is a covetous and amorous old dotard, and is made the butt of the piece. It. *Pantaleone*, the patron saint of Venice, is also a common baptismal name. It is also given as from the Gr. *pantalĕōn*=all lion. Hence a garment so called because worn by the Venetians.

PANTAMORPHIC, a. *păn'tă-mŏr'fĭk* [Gr. *panta*, all *morphē*, shape]: taking all forms.

PANTECHNICON, n. *păn-tĕk'nĭ-kŏn* [Gr. *panta*, all *technĭkos*, pertaining to art—from *technē*, art]: a place of sale or storage for every species of workmanship.

PANTELLARIA, *pân-tĕl-lâ-rē'â:* volcanic island in the Mediterranean, 60 m. s.w. of the Sicilian coast; 36 m. in circumference. The chief products are wine, oil, cotton, and fruit.

PANTHAYS: Mohammedan community occupying the province of Yun-nan in s.w. of China, who asserted their independence 1855. In 1856 they captured Talifoo, the second city of the province, and 1858, the capital. Their leader Wen-soai (King Suleiman) established his authority over about 4,000,000 of people, of whom not more than a tenth were Mohammedans. In 1866 the Chinese govt. recognized the independence of the Panthays, and 1872 their king sent his son Hassan on a mission to Europe. Meanwhile the Chinese again attaeked the Panthays, defeated them utterly, and finally suppressed their kingdom. Panthays is a form of *Pan-si*, the name by which the Mohammedans called themselves.

PANTHEISM, n. *păn'thē-ĭzm* [Gr. *pan*, all; *Thĕŏs*, God]: doctrine or system which maintains that the universe or nature is God. PAN'THEIST, n. *-ĭst*, one who holds pantheism. PAN'THEIS'TIC, a. *-ĭs'tĭk*, or PAN'THEIS'TICAL, a. *-tĭ-kal*, pertaining to Pantheism.—*Pantheism*, as a system of speculation, in its spiritual form, identifies the universe with God (*akosmism*); and in its more material form identifies God with the universe. It is only the latter kind of Pantheism that is logically open to the accusation of Atheism (q.v.); the former has often been the expression of a profound religiousness. The antiquity of Pantheism is undoubtedly great, for it is prevalent in one of the oldest known civilizations in the world—the Hindu. Yet it is eonsidered a later development of thought than Polytheism (q.v.), and originated probably in the attempt to divest the popular pagan system of its grosser features, and to give it a form that would satisfy the requirements of philosophical speculation. Hindu Pantheism as *akosmism* is taught especially by the Upanishads (q.v.) the Vedânta (q.v.), and Yoga (q.v.) philosophies, and by those poetical works which embody the doctrines of these systems; e.g., the Bhagavadgîtâ, which follows the Yoga doctrine. It is poetical and religious, rather than scientific, at least in its phraseology; but it is substantially similar to the more logical forms developed in Europe. The Hindu thinker regards man as born into a world of illusions and entanglements, from which his great aim should be to deliver himself. Neither sense, nor reason, however, is capable of helping him; only through long continued, rigorous, and holy contemplation of the supreme unity (Brahma) can he become emancipated from the deceptive influence of phenomena, and fit to

apprehend that he and they alike are but evanescent modes of existence assumed by that infinite, eternal, and unchangeable Spirit who is 'all in all.' Thus Hindu Pantheism is spiritual in its principle; matter and (finite) mind both alike are merged and lost in the fathomless abyss of illimitable and absolute being.

Greek Pantheism, though it probably originated in the same way as that of India, is at once more varied in its form, and more ratiocinative in its method of exposition. The philosophy of Anaximander (q.v.) the Milesian may almost, with equal accuracy, be described as a system either of atheistic physics or of materialistic pantheism. Its leading idea is, that from the infinite or indeterminate (*to apeiron*), which is 'one yet all,' proceed the entire phenomena of the universe, and to it they return. Xenophanes (q.v.), however, founder of the Eleatic school, and author of the famous metaphysical *mot, Ex nihilo nihil fit,* is the first classical thinker who promulgated the higher or idealistic form of Pantheism. Denying the possibility of creation, he argued that there exists only an eternal, infinite One or All, of which individual objects and existences are merely illusory modes of representation; but as Aristotle finely expresses it—and it is this last conception which gives to the Pantheism of Xenophanes its distinctive character—'casting his eyes wistfully upon the whole heaven, he pronounced that unity to be *God.*' Heraclitus (q.v.), a century later, reverted to the material Pantheism of the Ionic school, and appears to have held that the 'All' first arrives at consciousness in man, whereas Xenophanes attributed to the same universal entity, intelligence, and self-existence; denying it only personality. The most decided and the most spiritual representatives of this philosophy among the Greeks were the so-called 'Alexandrian' *Neo-Platonists* (q.v.), in whom is seen clearly, for the first time, the influence of the East on Greek thought. The doctrines of Emanation, of Ecstasy, expounded by Plotinus (q.v.) and Proclus (q.v.), no less than the fantastic Demonism of Iamblichus (q.v.), point to Persia and India as their birthplace; and in fact differ from the mystic teaching of the Vedânta only by being presented in a more logical and intelligible form, and divested of the peculiar mythological allusions of the latter.

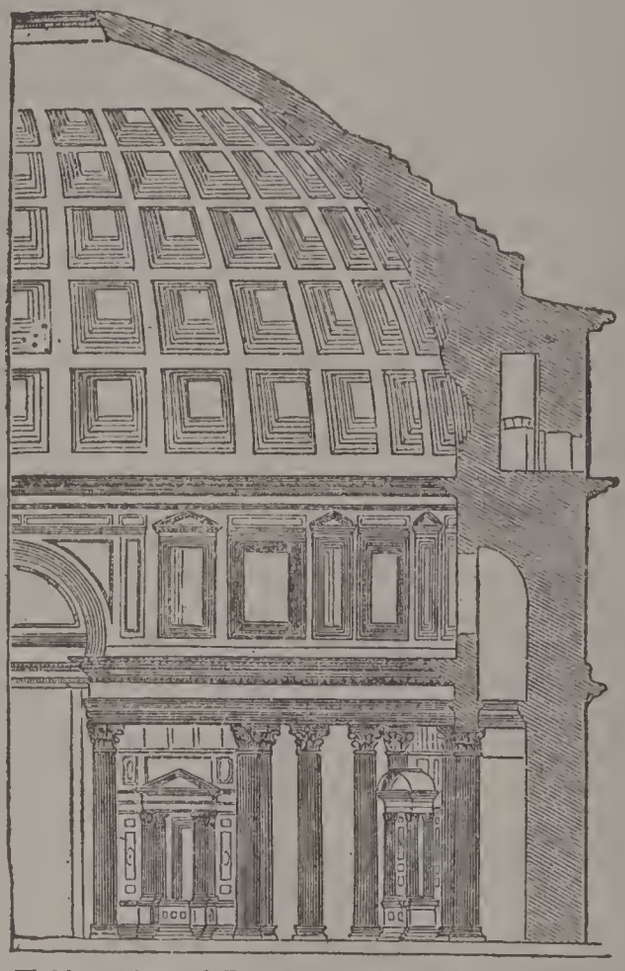
During the middle ages, speculation was, for the most part, held in with tight reins by the church; in consequence we hear little of Pantheism. Almost the only philosopher who advocated or who even seems to have thought about it is John Scotus Erigena (see ERIGENA), who was led to it probably by his study of the Alexandrians; but his speculations do not appear to have been thought by him incompatible with Christian faith; and in fact there are several profoundly mystical expressions employed in the New Testament, especially in the Epistles of John, in which the soaring spiritualism of Christianity culminates in language pantheistic at least

in form, e.g., 'God is love; and he that dwelleth in love dwelleth in God, and God in him.' Erigena is regarded as the link that unites ancient and modern Pantheism. We find in him now a reflection of the East and of Greece, and now a foreshadowing of the doctrines of Schelling and Hegel. His opinions were, with some scholastic modifications, introduced, in the 12th and 13th c., into theology by Amalric or Amaury de Chartres (a disciple also of Abelard), and his pupil David de Dinant, who were condemned as heretics.

Modern Pantheism shows itself first in Giordano Bruno (q.v.), burned at Rome 1600 for his opinions. In Bruno reappear the speculations of the Eleatics and of the Neo-Platonists, but with a still more definite recognition than in them of an absolutely perfect supreme spirit. The universe, in the eyes of the unfortunate Italian, is not, properly speaking, a creation, but only an emanation of the Infinite mind—the eternal expression of its infinite activity; hence the Infinite mind penetrates and fills, with different degrees of consciousness, all the heights and depths of the universe. To see God everywhere, to realize that He alone is, and that all else is but a perishable phenomenon or passing illusion—that there is but *one* intelligence in God, man, beast, and what we call matter—this should be the aim of all true philosophy. Spinoza (q.v.) comes next in the order of time among the great thinkers of pantheistic tendency, but he is perhaps the greatest, certainly the most rigorous and precise, of the whole class, that either the ancient or the modern world has seen. His system is based, like the geometry of Euclid, on certain definitions and axioms, and he claims to have given it as conclusive and mathematical a demonstration as the latter. None will deny the keenness and cogency of his ratiocination. The principal result at which, after a long, firm-linked chain of reasoning, Spinoza arrives, is, that there is but one substance, infinite, self-existent, eternal, necessary, simple, and indivisible, of which all existences else are but the modes; this substance is the self-existent God. To call Spinoza an atheist is absurd. The extravagant phrase of Schleiermacher regarding him, 'a God-intoxicated man' (*ein Gott-trunkener Mann*), is greatly nearer the truth, for no other human system of philosophy exhibits such an all-controlling and even overwhelming sense of the omnipresent God. Although he had no direct followers, he exercised great influence on the development of metaphysical speculation in Germany, where, with the exception of Kant (q.v.), the three greatest philosophers of recent times—Fichte (q.v.), Schelling (q.v.), and Hegel (q.v.)—all have promulgated systems of pantheistic tendency. See THEISM.

PANTHELISM, *păn-thē'lism* [Gr. *pan*, all and *thelein*, to will]: a term applied to the philosophic view that will is the fundamental reality of the world. The systems of Schopenhauer and Fichte represent this position in different ways.

PANTHEON, n. *păn'thē-ŏn* [Gr. *pan'theion*; L. *pan'thĕ̄on*]: in *anc. Greece* or *Rome*, a temple dedicated to all the gods—now specially applied to the church so called at Rome: thence the whole body of divinities worshipped by a people; or a work treating of them.



Half-section of Pantheon (from Fergusson).

The Pantheon at Rome, erected B.C. 27 by Agrippa, son-in-law of Augustus—now the church of Sancta Maria Rotonda—is the only ancient edifice in Rome that has been perfectly preserved: it is lighted through one aperture in the centre of its magnificent dome. It stands near the central point of the famous Campus Martius, is built of fine brick, and is in the form of a circle 143 ft. in diameter, and is capped by the most magnificent dome in the world. The dome is 28 ft. 6 in. in diameter at the top, about 40 ft. at the centre, rests upon a wall 20 ft. thick, and rises to a height of 143 ft. from the pavement. The portico is 110 by 44 ft., and is supported by 16 splendid columns of Corinthian granite, 46½ ft. high and 15 ft. in circumference, with bases and capitals of marble. The building was intended, it is said, as a temple to Jupiter Vindicator, but Agrippa dedicated it to all the gods. It was defaced by the invaders of Rome, but was restored 608 by Boniface IV., who consecrated it to the Virgin and the Saints.

PANTHER, n. *păn'thėr* [L. *panthēra;* Gr. *panthēr*]: a spotted wild beast, very ferocious. PAN'THERESS, n. *-ĕs*, a female panther. PANTHERINE, a. *-īn*, pertaining to or resembling the panther.—The *Panther* is one of the largest *Felidæ;* now supposed identical with the Leopard (q.v.), or a mere variety of it, differing only in its larger size and deeper color. Cuvier distinguishes the P. from the leopard, but without stating any characters other than those of color. The name P. (vulg.

American Panther or Puma (*Felis concolor*).

'Painter') is given to the Puma (q.v.) in America.

PANTICAPÆ'ON: see KERTCH.

PANTILE, n. *păn'tīl* [F. *pente*, a slope: comp. W. *pantu*, to dimple]: a tile straight in its length, but having a waved or hollow surface transversely—also spelled *pentile.*

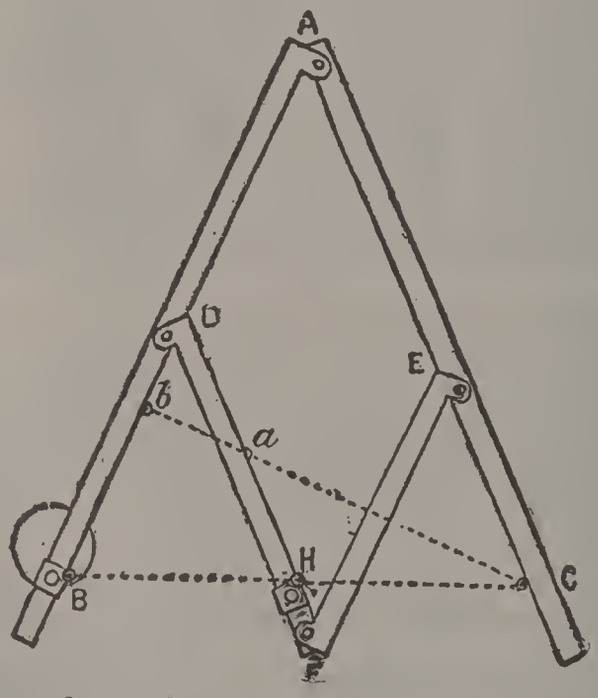
PANTING: see under PANT.

PANTISOCRACY, n. *păn'tĭ-sŏk'ră-sĭ* [Gr. *pantĕs*, all; *isos*, equal; *kratein*, to rule]: the name applied to Southey's and Coleridge's scheme, in their younger days, of reorganizing humanity on a communistic basis, or a commonwealth. PAN'TISOCRAT'IC, a. *-sō-krăt'ĭk*, pertaining to.

PANTLER, n. *pănt'lėr* [from PANTRY, which see]: in *OE.*, in a great family, an officer who had charge of the bread.

PANTOCHRONOMETER, n. *păn'tō-krŏ-nŏm'ĕ-tėr* [Gr. *pantos*, of all; *chronos*, time; *metron*, a measure]: an instrument which comprises a compass, a sun-dial, and a universal time-dial.

PANTOGRAPH, n. *păn'tō-grăf*, or PANTAGRAPH [Gr. *pantos*, of all; *graphō*, I write]: instr. for enabling unskilled persons to copy, to reduce, or to enlarge maps, plans, etc. PAN'TOGRAPH'IC, a. *-grăf'ĭk*, or PAN'TOGRAPH'ICAL, a. *-grăf'ĭ-kăl*, pertaining to or done by a pantograph. PAN'TOGRAPH'ICALLY, ad. *-lĭ*. PANTOGRAPHY, n. *păn-tŏg'ră-jĭ*, general description; entire view —A *Pantograph* is an instrument by the aid of which any engraving may be copied on paper, though its use is in practice restricted to the copying of maps and plans. The copy can be drawn to any scale. The instrument consists of four rods, AB, AC, DF, and EF, jointed together, as in the figure; the points D and E are so taken that AD is equal to EF, and AE to DF, and consequently ADEF is always a parallelogram. If C be a determinate point near the end of the rod AE, and any line, CHB, be drawn cutting the other three rods, the triangles BAC and BDH are similar; so that, when the point B is fixed, the points C and H, which can, from the structure of the instrument, move in any direction, will describe similar figures different in size; that described by C being to that described by H in the proportion of CB to HB. The practical working of the instrument is as follows: The points H and B are determined by the ratio BH to BC, which is the proportion the scale of the copy bears to that of the original; a socket,



which slides along the arm, is fastened exactly at B on the under side; below this is placed a heavy weight, with a stalk fitting into the socket, thus rendering B the centre of motion of the instrument, if the weight be heavy enough. A pencil is fitted into another socket at H, and a rod of metal with a sharp point, called the *tracer*, is fastened at C, and the instrument is fitted with casters at various points underneath, to allow of its being moved freely. The operator then passes the tracer

over the outline to be copied, and simultaneously the pencil at H makes the copy on the required scale. If a copy on a scale nearly as large as the original be required, the fulcrum must be placed in DF, and the pencil in DB; while if a magnified copy be required, the pencil and tracer must exchange the positions assigned them in the first case. The defects of this instrument are its weight and the difficulty of rendering it perfectly mobile, both of which prevent that steady motion of the tracer which is necessary for an accurate copy. There is a variety of forms, all depending on the principle that the two triangles which have for their angular points the fulcrum, the pencil-point, and a joint, and the fulcrum, the tracer-point, and a joint, must always preserve their similarity.

PANTOLOGY, n. *păn-tŏl′ŏ-jĭ*, or PANTOLOGIA, n. *păn′-tō-lō′jĭ-ă* [Gr. *pantos*, of all; *logos*, discourse]: a dictionary of universal knowledge. PANTOLOGICAL, a. *păn′tō-lŏj′ĭ-kăl*, pertaining to. PANTOL′OGIST, n. *-tŏl′ŏ-jĭst*, a writer of a work of universal knowledge.

PANTOMETER, n. *păn-tŏm′ĕ-tėr* [Gr. *pantos*, of all; *metron*, a measure]: an instrument for measuring angles, elevations, and distances of every description.

PANTOMIME, n. *păn′tō-mīm* [F. *pantomime*—from L. *pantomīmus*, a ballet, a pantomime—from Gr. *pantos*, of all; *mimos*, an imitator]: theatrical entertainment in which the tale or plot is either chiefly or wholly developed in mute action, accompanied with music, gorgeous scenery, etc.: a popular theatrical exhibition in which are introduced mimicries or satirical representations of the leading characters and events of the day. Also, a person who acts his part by gesticulation only, or by dumb show. PAN′TOMIM′IC, a. *-mĭm′ĭk*, or PAN′TOMIM′ICAL, a. *-ĭ-kăl*, pertaining to or consisting of pantomime. PAN′TOMIM′ICALLY, ad. *-kăl-lĭ*. PAN′TOMIM′IST, n. one who acts in pantomimes.—A *Pantomime*, among the anc. Romans, denoted not a spectacle, but a person. The pantomimes were a class of actors who (as the name implies) acted not by speaking, but wholly by mimicry—gesture, movements, and posturings—corresponding therefore to modern ballet-dancers. When they made their first appearance in Rome cannot be ascertained; probably the *histriones* (Etrusc. *hister*, a dancer) brought from Etruria to Rome, B.C. 364, were pantomimes; but the name does not once occur during the republic, though it is frequent from the very dawn of the empire. Augustus showed great favor to this class of performers, and is consequently supposed by some writers to have been the inventor of the art of dumb acting. The most celebrated pantomimes of the Augustan age were Bathyllus (freedman of Mæcenas), Pylades, and Hylas. The class soon spread over all Italy and the provinces, and became so popular with the Roman nobles and knights (who used to invite male and female performers to their houses to entertain their guests), that

Tiberius reckoned it necessary to administer a check to their vanity, by issuing a decree forbidding the aristocracy to frequent the houses of the pantomimes or to be seen walking with them in the streets. Under Caligula they were again received into the imperial favor; and Nero, who carried every unworthy weakness and vice to the extremity of caricature, himself acted as a pantomime. From this period they had uninterrupted popularity as long as paganism held sway in the empire.

As the pantomimes wore masks, no facial mimicry was possible; everything depended on the movements of the body. It was the hands and fingers chiefly that spoke; hence the expressions *manus loquacissimæ*, *digiti clamosi*, etc. To such perfection was this art carried, that it is said the pantomimes could give a finer and more precise expression to passion and action than the poets themselves. The subjects thus represented in dumb-show were always mythological, consequently known to the spectators. The dress of the actors was made to reveal and not to conceal the beauties of their person; and as, after the 2d c., women began to appear in public as pantomimes, the effect of the æsthetical costume was injurious to morality. Sometimes these pantomimic actresses even appeared quite naked before an audience—a thing which could never have happened had the Roman communities not become thoroughly base, sensual, and impure. It was quite natural, therefore, that pantomimic exhibitions should have been denounced by the early Christian writers, as they even were by pagan moralists like Juvenal.

For the character of the modern pantomimes—which word denotes not the performers, but the pieces performed—see HARLEQUIN. A few additional facts are here given. The Christmas P., or Harlequinade, is, in its present shape, essentially a British entertainment, and was introduced into that country 1702 by a dancing-master of Shrewsbury named Weaver. One of his pantomimes, *The Loves of Mars and Venus*, had great success. The arrival in London 1717 of a troupe of French pantomimists with performing dogs gave an impetus to this kind of drama, which was further developed 1758 by the arrival of the Grimaldi family, the head of which was a posture-master and dentist. Under the auspices of this family, the art of P. was greatly cultivated and the entertainment much relished. Joseph Grimaldi, son of the dentist, was clever at inventing tricks and devising machinery, and *Mother Goose*, and others of his harlequinades, had an extended run. At that time the wit of the clown was the great feature; but later, as good clowns became scarce, other adjuncts were supplied, such as panoramas or dioramic views; and now the chief reliance of the manager is on scenic effects, large sums of money being lavished on the *mise en scène*. This is the case particularly as regards the transformation scene—i.e., the scene where the characters are changed into clown, harlequin, etc.

PANTON, n. *păn'tŏn* [prov. Ger. *pantine*, a wooden shoe : F. *patin*, a high-heeled shoe, a skate] : a particular form of horse-shoe to recover a narrow and hoof-bound heel.

PANTOPHAGIST, n. *păn-tŏf' ă-jĭst* [Gr. *pantos*, of all; *phagein*, to eat or devour] : a person or animal that eats all kinds of food.

PANTRY, n. *păn'trĭ* [F. *paneterie*, a pantry—from *pain*, bread : mid. L. *panetārĭă*, a place where bread is made—from L. *panis*, bread] : a room for storing provisions for domestic use.

PANZOISM, n. *păn'zō-ĭzm* [prefix *pan-;* Gr. *zōē*] : in *biol.*, term used to denote all the elements or factors which constitute vital energy or life.

PAOLI, *pow'lē*, PASCAL : Corsican patriot : 1726–1807, Feb. 5 ; b. Morosaglia, in Corsica. His father, a leader in the unsuccessful insurrection of the islanders against the Genoese and their French allies, was compelled to retire to Naples 1739, taking his son with him. 1755, July, he was summoned by the supreme magistracy to Corsica, and was elected capt.gen. of the island, and the chief of a democratic govt., possessing all the power of a king, but without the title. He energetically and successfully applied himself to the reformation of the barbarous laws and customs of the island, and to the expulsion of the Genoese, who were compelled to seek aid from France, and finally ceded the island to that country. P. refused all the advantageous offers by which the French govt. sought to bribe him, as he had before refused those of the Genoese, and continued to struggle for the independence of his country ; but he was signally defeated by the Comte de Vaux, at the head of the French troops, and the French became masters of Corsica. P. finally took refuge on a British frigate and sailed for England, where he found general sympathy. 20 years afterward, the French Revolution of 1789 recalled him to Corsica ; and during the anarchy of France 1792–3, he conceived a scheme for making Corsica an independent republic. Until this time he had been on the best terms with the Bonaparte family ; but they now joined the Jacobin party, while he allied himself with Britain, favored the landing of 2,000 British troops in the island 1794, and joined them in driving out the French. He then surrendered the island to George III., but, becoming dissatisfied with the govt., he quarrelled with the British viceroy, while many of his countrymen were displeased with his course in allying himself with the British. He therefore retired from the island 1796, and spent the remainder of his life in the neighborhood of London, and there died.

PAO'LO, FRA : see SARPI, PIETRO.

PAO'LO VERONE'SE : see CAGLIARI, PAOLO.

PAP, n. *păp* [Lith. *papas;* L. *papilla;* It. *poppa*, the nipple or breast: It. *pappa*, soft food prepared for infants—from *poppārĕ*, to suck: Ger. *pappe*, pap, paste: O. Sw. *papp*, the breast]: soft food for infants, made of boiled bread sweetened; the pulp of fruit; a nipple or teat. PAPPY, a. *păp'pĭ*, soft; succulent.

PAPA, n. *pă-pâ'* [L. *papa*, a child's name for father: Russ. *papa*, bread, and the same in many other languages]: the child's name for father.

PAPA, *pâ'pŏh:* large market-town in w. Hungary, in a beautiful district on the Tapolcza, affluent of the Marczal, 60 m. s.s.e. of Presburg. It contains a stately castle, with a beautiful garden, handsome Rom. Catholic and Lutheran churches, Rom. Catholic gymnasium, Reformed college, and a hospital. Stoneware, cloth, and pipes are manufactured, and there is trade in wine. Pop. (1890) 14,261.

PAPA, *pa-pâ'* or *pâ'pa:* Latin form of the title now, in the Western Church, given exclusively to the bishop of Rome (see PAPACY). Originally, however, meaning simply 'father,' it was given indiscriminately to all bishops. Tertullian (*De Pudicitia*, cxiii.) so employs it. Dionysius, priest of Alexandria, calls his bishop Papa Heraclias. St. Cyprian, in the letters of his clergy, is addressed *Beatissimo Papæ Cypriano.* The same form is employed toward him by the clergy of Rome itself. Even Arius so addresses his own bishop Alexander. In the next c., St. Jerome addresses the same title to Athanasius, to Epiphanius, and most of all to Augustine. Indeed it appears certain that to the time of Gregory of Tours it was used not uncommonly of bishops in the Western Church. And there are evidences of its being occasionally applied to the inferior clergy, for whom, however, some adjunct was employed to distinguish them from bishops. Thus, we sometimes read of *papæ pisinni*, minor popes; and the tonsure was called by the name *papa letra.* In the Greek Church, whether in Greece proper or in Russia, papa is the common appellation of the clergy. The circumstance of its having been originally of general application is acknowledged by all learned Rom. Cath. controversialists and historians.

PAPACY, n. *pā'pă-sĭ* [mid. L. *papatia*, the papal dignity: It. *papato*, the dignity of the pope—from *Papa*, the pope: F. *papauté*, the popedom—from *Pape*, the pope]: the dignity of the pope, and the time of his reign; the popes taken collectively: see POPE: ROMAN CATHOLIC CHURCH: INFALLIBILITY OF THE CHURCH: TEMPORAL POWER OF THE PAPACY. PAPAL, a. *pā'păl* [F. *papal*, papal—from mid. L. *papālis*, belonging to the pope]. of or relating to the pope or popedom. PA'PALLY, ad. *-lĭ.* PAPALIZE, v. *pā'păl-īz*, to make papal. PA'PALIZING, imp PA'PALIZED, pp. *-īzd'.*

PAPAL STATES, *pā′păl* (Italian, STATI DELLA CHIESA, or STATI PONTIFICI): territory, or rather group of states, in central Italy, formerly united into one sovereignty, with the pope for its head. It was of irregular form, resembling the letter Z, the upper portion lying e. of the Apennines, the lower w. of that range, these two being connected by a third strip, which crossed the peninsula from e. to w. The former P. S. were bounded n. by the Po, s. by Naples, e. by the Gulf of Venice and Naples, w. by Modena, Tuscany, and the Tyrrhenian Sea; total area (1859, the year before the disruption began) 15,774 Eng. sq. m.; pop. more than 3,000,000. Detached portions, as Benevento and Pontecorvo, lay within the Neapolitan territory. The country is traversed by the Apennines, which attain their highest elevation in the Monte della Sibilla, about 7,402 ft. above sea-level. As this range, which traverses the peninsula in the direction of its length, lies so much nearer the e. than the w. coast, the streams e. of it have a short course and little volume, being mere mountain torrents; while on the w. side a few of the rivers are of considerable size: of these the Tiber (q.v.) is the largest. The e. coast is bold and rugged, and destitute of good harbors, that of Ancona alone excepted; toward the n., at the mouth of the Po, the coast gradually subsides into a low, marshy tract, with numerous lagunes. The country w. of the Apennines is traversed by ranges of hills parallel to them, and gradually decreasing in elevation as they approach the sea. The coast itself is almost wholly flat, sandy, or marshy, with no deep bays and few good harbors besides Civita Vecchia.

The country was divided into 20 districts: 1 Comarca, including Rome and the Agro Romano; 6 Legations and 13 Delegations. The Legations of Bologna, Ferrara, Forli, and Ravenna constituted the *Romagna*; Spoleto and Perugia were known as *Umbria*; and Ancona, Fermo, Macerata, and Ascoli constituted the *March of Ancona*. The inhabitants, except 16,000 Jews, were Italian, and Rom. Catholics. The only provinces which latterly remained under the papal rule were Rome, with the Comarca, the Legation of Velletri, and the Delegations of Civita Vecchia, Frosinone (excepting Pontecorvo), and Viterbo; total area 4,493 Eng. sq. m.; pop. about 700,000. The chief cities and towns in the territory were Rome (capital), Viterbo, Velletri, Alatri, and Civita Vecchia.

Climate and Products.—The climate of the P. S. is one of the finest in the world, and the heat of summer is tempered by the mild and cooling sea-breezes; but in the flats s. of the Po and in the Campagna of Rome, the noxious atmosphere produced by exhalations from the marshes is most destructive of human life. Fever and ague are very prevalent in the neighboring districts; and notwithstanding the attempts to remedy the deadly influence of the marshes by drainage and cultivation, it has hitherto been undiminished (see MAREMMA). Violent

siroccos are occasionally experienced on the w. coast. The n. portion, from its elevation, is exposed to severe cold during winter. The soil of the P. S. is in general extremely fertile; but the higher mountain districts are either quite barren, or adapted only for pasture; and not more than one-third of the whole surface is under cultivation. The practice of agriculture is in its most primitive state, notwithstanding the fact that agriculture, as a science, originated here and was practiced for many centuries before it was introduced into the other countries of Europe; but the many political changes and revolutions which have convulsed the country have acted as a bar to all enterprise. The products are similar to those of the rest of Italy. Manufactures are comparatively unimportant—silks, woolens, and leather are the chief; but plate-glass, rope, sail-cloth, cotton goods, paper, artificial flowers, wax-candles, soap, stoneware, etc., also are manufactured. The fisheries are important. The chief minerals are alum, vitriol, saltpetre, sulphur, coal, rock-salt, marble, and alabaster. No statistical information on manufacturing and commercial topics was issued in the latest years of the political power of the pope.

Government.—The pope possessed absolute and unlimited power, but the members of the college of cardinals, who elected him, generally kept the chief offices of state in their own hands, and assisted the pope in the govt. of his states, as well as in the affairs of the church. The sec. of state was at the head of political affairs, and was nominated by the pope. He presided over both the ministerial council and the council of state. The former council, which consisted of five or more ministers, heads of departments, selected by the pope, had a voice in legislation, also the right of authoritative interpretation of the laws: the latter, of 13 members, also nominated by the pope, had in matters of legislation and finance the right only of giving advice; but it settled any question of competency that might arise between the various branches of the administration. After 1850, there was also a separate *finanz-consulta* for the regulation of financial affairs. The Comarca, which was more directly under the central govt., was ruled by a cardinal-president; the Legation was ruled by a cardinal-legate, aided by a provincial chamber of deputies. There were civil and criminal courts in all the provinces, minor courts in the communes, with courts of appeal in all the chief cities, and a central tribunal at Rome. All the proceedings of these courts were public, except trials for political offenses.

The papal army, which formerly amounted to 20,000 men, in 1863, June, numbered only 8,513 men, infantry, cavalry, artillery, etc., included, and a considerable portion of the papal territory was garrisoned by French troops, without whose aid the pope's power could not have been maintained.

The income and expenditure for 1859, the last year of

the entirety of the P. S., were respectively 14,453,325 scudi (£3,126,028, $15,192,496) and 15,019,346 scudi (£3,248,038, $15,785,464); but the three succeeding years showed a widely different result; the expenses being largely increased by the cost of the war, while from the rebellious provinces scarcely any taxes were collected. The finances continued in the same deplorable condition, and the national debt amounted to about $85,000,000. The tax known as 'Peter's pence,' which was collected from all the Rom. Cath. countries, had produced at the beginning of 1863 about $5,400,000.

History.—During the rule of the Goths and Lombards in Italy, the inhabitants of Rome and all who desired to live free from the barbarian yoke, feeling that the Greek empire was incapable of protecting them, and at the same time observing the pertinacity and energy with which the pope asserted the importance and dignity of Rome, naturally looked up to him as in some sort a protector; and it is chiefly to the gradual growth and spread of this feeling that the important position subsequently taken by the popes as authorities in temporal matters is due. About 720, Gregory III., having quarrelled with Emperor Leo the Isaurian, declared the independence of Rome. In 726 Pepin le Bref compelled the Lombard king to hand over Ravenna, Rimini, Pesaro, Fano, Cesena, Urbino, Forli, Comacchio, and 15 other towns, to the pope, who now assumed the state of a temporal sovereign. Pepin's example was followed by his son Charlemagne; but, notwithstanding, the pope's sovereignty was more nominal than real, as the towns were not in his possession, and he obtained only a small share of their revenues. In the 11th c., the Normans greatly aided to increase the papal temporal authority, and 1053 the duchy of Benevento was annexed. In 1102 Countess Matilda of Tuscany left to the pope her fiefs of Parma, Mantua, Modena, and Tuscany; but these were immediately seized by the German emperor, and of this magnificent bequest only a few estates came into the pope's hands. Between this period and the end of the 13th c., the popes succeeded, not always by scrupulous means, in obtaining from many of the free towns of Italy an acknowledgment of the superiority of the Roman see over them; and 1278 Emperor Rodolf I. confirmed the popes in the acquisitions thus obtained, defined authoritatively the boundaries of the P. S., and acknowledged the pope's exclusive authority over them, by absolving their inhabitants from their oath of allegiance to the empire. The P. S. at this time included Perugia, Bologna, Bertinoro, the duchy of Spoleto, the exarchy of Ravenna, and the March of Ancona; but many of the towns were either republics or hereditary principalities, and in none did the pope possess real authority. Sixtus IV., in the end of the 15th c., managed to annex the Romagna to his dominions; in effecting which he is accused of having employed intrigue, perjury, and murder. His successors, Alexander VI. and

Julius II., increased the P. S. by the addition of Pesaro, Rimini, Faenza, Parma, Placentia, and Reggio. By the victory of the French at Marignan (1515), the very existence of the papal power was threatened; but the able policy of Leo X. averted the threatened danger. In 1545 Paul III. alienated Parma and Placentia, and erected them into a duchy for his son, Pietro Luigi Farnese; but this loss was partly made up by the acquisitions of Gregory XIII. In 1598 the possessions of the House of Este—viz., Ferrara, Comacchio, and a part of the Romagna—were seized by Pope Clement VIII.; and the P. S. received their final additions in Urbino (1623), Ronciglione, and the duchy of Castro (1650). The Romagna was seized by Napoleon 1797, and incorporated in the cisalpine republic; and in the following year Rome was taken by the French, and the P. S. erected into the *Roman Republic*. Pius VII., 1800, obtained possession of his states, but they were almost immediately retaken by the French, and finally (1809) incorporated with France, Rome being reckoned the second city of the empire. In 1814 the pope returned to his dominions, and was formally reinstated by the treaty of Vienna, mainly through the exertions of the *non-Roman-Catholic* powers, Russia, Prussia, and Britain; but the clerical misgovernment contrasted so strongly with the liberal administration of France, that 1830 the people of Ancona and Bologna rose in rebellion. They were put down by the aid of an Austrian army; but the abuses in the administration were so flagrant, that even Austria urged the necessity for reform. Her remonstrances, however, were not attended to, and the Bolognese again rebelled. This second revolt supplied Austria with a pretext for occupying the northern Legations, and the French at the same time garrisoned Ancona. Occasional risings took place from time to time till 1846, when the late pope, Pius IX., assumed the tiara, and burst upon the astonished world in the new character of a reforming pope. His projects were most liberal, and were put in force with great energy, despite the opposition of Austria; but, alarmed at the spread of revolution in Europe during 1848, he halted in his career, just at the critical moment when to halt was to be lost. The people rose, and Pius IX. fled to Gaeta, while Rome was proclaimed a republic. He was restored, and his subjects reduced to submission, by the arms of France, Austria, Naples, and Spain. The Austrians held the Legations in subjection to the pope's authority till 1859; and the French occupied Rome in his behalf 10 years more. 1859, July, the four northern Legations (the Romagna), taking advantage of the withdrawal of the Austrian troops, quietly threw off the papal authority, and proclaimed their annexation to Sardinia, which was formally acknowledged by Victor Emmanuel 1860, Mar. The pope now raised a large body of troops, appointing Lamoricière, an eminent French gen., to command them, for the purpose of resisting any further encroachments

on his dominions; but the news of Garibaldi's success in Sicily and Naples produced revolt in the Legation of Urbino and in the Marches, the people proclaiming Victor Emmanuel. The Sardinians accordingly marched into the P. S., defeated Lamoricière in two encounters, and finally compelled him to retire into Ancona, where, after a siege of seven days, he was compelled to surrender with his whole army. The revolted provinces of Umbria, Urbino, and the Marches were immediately annexed to Sardinia; and the isolated provinces of Benevento and Pontecorvo (a part of Frosinone), which were within the kingdom of Naples, shared the same fate. 1870, Oct., the French having withdrawn, the remnant of the P. S. voted for annexation to the kingdom of Italy (q.v.). See TEMPORAL POWER OF THE PAPACY.

PAPAVERACEÆ, *pa-pā-vėr-ā′sē-ē:* natural order of exogenous plants, herbaceous or half shrubby, usually with milky or colored juice. The leaves are alternate, without stipules; the flowers on long one-flowered stalks. The fruit is pod-shaped or capsular; the seeds are numerous. The order is distinguished for narcotic properties. Opium (q.v.) is its most important product. The juice of Celandine (q.v.) is very acrid. A number of species are used in their native countries for medicinal purposes. The seeds yield fixed oil, which, except that obtained from *Argemone Mexicana*, is quite bland. See POPPY. The flowers of many species are large and showy, most frequently white or yellow, sometimes red. Several kinds of Poppy and Eschscholtzia are frequent in gardens. There are in all about 130 known species, natives of all quarters of the world, and of tropical and temperate climates, but abounding most in Europe.

PAPAVERACEOUS, a. *pă-păv′ėr-ā′shŭs* [L. *papāver*, a poppy]: resembling the poppy or pertaining to it; pertaining to the order of plants of which the poppy is the type, called PAPAVERA′CEÆ, n. plu. *-pā-vėr-ā′sē-ē.* PAPAVERINE, n. *pă-păv′ėr-ĭn*, an alkaloid found in opium. PAPAV′EROUS, a. *-ŭs*, having the qualities of the poppy.

PAPAW, n. *pă-paw′* [Mal. *papāya*], (*Carica Papaya*): S. American tree—and its fruit—of nat. order *Papayaceæ*—of which order about 30 species are known—which has now been introduced into many tropical and subtropical countries, and is plentiful in the E. and W. Indies. The name is written sometimes *Pawpaw;* and another name is *Melon-tree.* It grows to the height of 15–30 ft., with leaves only at the top, where also the fruit grows close to the stem. The leaves are 20–30 inches long. The fruit is of green color, very similar in appearance to a small melon, and with a somewhat similar flavor. It is eaten either raw or boiled. The seeds are round and black, and, when chewed, have in a high degree the pungency of cresses. The powdered seeds and the juice of the unripe fruit are most powerful anthelmintics. A constituent of this juice is *Fibrine*, otherwise unknown in the vegetable kingdom, except in the Fungi. The

milky juice of the tree is very acrid. The leaves are used by negroes instead of soap to wash linen. The juice of the fruit and the sap of the tree have the singular property of rendering the toughest meat tender in a short time. Even the exhalations from the tree have this prop-

Papaw Tree (*Carica Papaya*).

erty; and joints of meat, fowls, etc., are hung among its branches to prepare them for the table. It is a tree of extremely rapid growth, bears fruit all the year, and is exceedingly prolific. The fruit is eaten raw, or is cooked in various ways.—The *Chamburu* (*C. digitata*), another species of the same genus, native of Brazil, is remarkable for the extremely acrid and poisonous character of its juice, and the disgusting stercoraceous odor of its flowers.—In the middle and southern United States, the name P. is given to the *Asimina* (or *Uvaria*) *triloba*, small tree of nat. order *Anonaceæ*, the fruit of which, a large oval berry, three inches long, is eaten by negroes, but not generally relished by others; all parts of the plant have a rank smell.

PAPENBURG, *pâ'pėn-bûrg* or *-bûrch*: a small town of Hanover, bailiwick of Osnabrück, on a canal navigable for sea-going vessels, 27 m. s.s.e. of Emden, on Dollart Bay, by the Emden and Hanover railway. It originated in a small colony supported principally by peat-cutting, for which the fens and moors of the vicinity afford facilities. The town is cleanly built, after the Dutch model; its houses stretch along the canal banks. It had, 1881, about 190 ships, and carries on manufactures of sail-cloth and ropes. Pop. (1890) 6,933.

PAPER, n. *pā′pĕr* [F. *papier*, paper—from L. *papy′rus:* Gr. *pap′ūros*, the paper-reed of Egypt: comp. W. *pabwyr*, rushes]: thin substance in the form of sheets obtained from the pulp of rags, straw, etc., used for writing on, for printing on, and for a vast variety of purposes (see below): a printed sheet appearing periodically: bills of exchange; bank-notes: any written instrument: ADJ. made of paper; frail; slight; thin: V. to cover with or inclose in paper. PA′PERING, imp.: N. the operation of covering or lining with paper. PA′PERED, pp. *-pĕrd:* ADJ. covered with paper. PA′PERY, a. *-pĕr-ĭ*, like paper; having the thinness and consistency of paper. PAPER-BOOK, in *English law*, name given to the collection of the pleadings on both sides in an action, when the issue is not of fact, but of law. PAPER-COAL, a name applied to certain layers of the Tertiary lignites, from their papery or leaf-like composition, being evidently masses of compressed leaves. PAPER-HANGER, one who covers the walls of rooms with ornamental paper. PAPER-HANGINGS (see below). PAPER-KITE, a boy's plaything for flying in the air. PAPER-MONEY, or PAPER-CURRENCY, bank-notes and bills of exchange. PAPER-MAKING, the art or trade of manufacturing paper (see PAPER, below). PAPER-MILL, the machinery employed in making paper; the factory where it is made. PAPER-RULER, one who traces paper with lines in every variety of order and color. PAPER-STAINER, one who makes paper-hangings. BLOTTING-PAPER, a soft paper having wool in it, for absorbing superfluous ink from any writing, and so drying it. CARTRIDGE-PAPER, a specially prepared paper for cartridges. POST-PAPER, letter-paper of a large size. TISSUE-PAPER, a very thin transparent paper made of the refuse of the flax-mills. WASTE-PAPER, paper thrown aside as no longer valuable for its intended purpose. WOVE-PAPER, paper with a uniform surface, and not ribbed or water-marked as *laid-paper* is. WRITING-PAPER, paper sized, in contradistinction to printing or unsized paper.

Note.—A sheet of paper is made of various sizes; but, of whatever size, a sheet when folded into

2	leaves,	is called	*folio.*
4	"	"	*quarto.*
8	"	"	*octavo.*
12	"	"	*duodecimo.*
18	"	"	*octodecimo.*
24	"	"	*quarto-vigesimo.*
32	"	"	*secundo-trigesimo.*

These names in books usually appear in contracted forms consisting of numerical values followed by the terminations of the Italian names—thus, 4to, 8vo, 12mo, 18mo, 24mo, and 32mo—see these titles.—The varieties in forms and sizes of paper have become so numerous that the terms *folio*, *quarto*, etc., no longer have in this country a definite meaning as to size. *Folio*, *Quarto*, and *Octavo* each include 4 sub-sizes, known as *Royal*, *Demi*, *Crown*, and *Foolscap*, respectively (e.g., Royal Folio, Crown Octavo, etc.).

PAPER: fabric composed usually of vegetable fibres minutely divided and recombined in thin sheets, either by simple drying in contact, or with the addition of size or other adhesive material. Probably the earliest use of paper was for writing upon, and its earliest form was the Papyrus (q.v.) of the Egyptians. The stems of the papyrus plant, often eight or ten ft. long, are soft and green, externally like the common rush; and the interior consists of a compact cellular tissue or pith. In preparing papyrus for use as a writing material, a section of the stem was sliced longitudinally with a sharp knife or some such instrument, the strips from the centre being the broadest and most valuable. The strips were then laid on a board side by side to the required width, and another layer of strips was laid across them at right angles. The whole was then moistened with water, which dissolved the glutinous matter in the papyrus, and the sheet was first pressed, then dried in the sun. Any roughness was levelled by polishing with ivory or a smooth shell. It was once supposed that the strips used in making the sheet of papyrus paper consisted of pellicles or membranes surrounding the pith and lying just under the rind; but no such membranes are found in the plant, whose stem contains only a cellular pith within the rind. The width of the sheets, of course, depended on the length of the strips of papyrus pith; the greatest width, according to Pliny, was 13 *digiti* (about 9½ in.); but the sheets could be made any length by joining a number of the squares end to end by glue or any other adhesive material. The *scapus*, or roll, usually consisted of about 20 of them.

Owing to the fact that the strips are wider and better as they come from nearer the centre of the stem, the makers were enabled to produce papers of different qualities; and in the time of the Romans many varieties were known, which differed in width, color, fineness, thickness, and weight. The finest quality was made from the central strips, and was called *Hieratica*, or paper of the priests, having been used originally for sacred writings only. In Rome the Hieratica got the name *Augusta* in compliment to Augustus, while the second quality was called *Liviana*, after his wife; and the original name of the first quality came in time to be applied to the third quality. The next quality was called *Amphitheatrica*, supposably from its having been made in the vicinity of the Alexandrian amphitheatre. This last, when imported to Rome, was partly remanufactured by Remmius Fannius Palæmon, schoolmaster and paper-maker, who, by a peculiar process of his own, reduced its thickness, and rendered it equal to the first quality, when it was sold under the name *Fanniana*. There were inferior qualities, of which one called *Emporetica* was used as shop-paper: this was 6 *digiti* (4⅜ in.) wide. Pliny, to whom we are indebted for most of these details, recognized fully the important part played by P. in the history of civilization: 'On

the use of paper' (*charta*), he writes, 'depends in a very great degree human culture and the memory of the past; again, on it depends "man's immortality"' (*Hist. Nat.*, XIII. 21).

In India and China, the art of writing with a style or sharp point on dried palm and other leaves, and also on some kinds of bark, is common even at the present day, especially in Ceylon, where frequently the leaves of the talipot and other palms are employed as paper. Perhaps it was from the employment of these materials, or, it is even possible, from watching the operations of the paper-making wasps and other insects, that the manufacture of larger pieces, by pulping the materials and spreading them out to a greater extent, was suggested. Whatever was the true origin of the art, it is now lost in the vista of time.

It is known that the Chinese were acquainted with the art of making P. from pulp artificially prepared as early as the commencement of the Christian era; and it is thought that they used the bark of various trees, the soft parts of bamboo stems, and cotton. In the 7th c. the Arabians learned from the Chinese the art of making it of cotton, and the first manufactory was established about A.D. 704, at Samarcand. Thence it was transplanted to Spain, where, under the Moors, P. was made not only of cotton, but, it is thought, also of hemp and flax. The exact time of the introduction of P. made of linen rags is very uncertain; but Peter of Clugny (d. 1150), in his polemic *Adversus Judæos*, speaks of books written on material made of 'scrapings of old tatters' (*ex rasuris veterum pannorum*), meaning in all probability both linen and woolen rags: the best evidence, however, is offered by the Arabian physician Abd-ul-Latif, who writes, in an account of his visit to Egypt 1200, that 'the cloth found in the catacombs, and used to envelop mummies, was made into garments, or sold to the scribes *to make paper for shopkeepers;*' and as there is no doubt that these mummy-cloths were linen, it proves that the use of this material is of great antiquity. Of the use of cotton P. in Europe, the earliest proof is in a deed of Roger, King of Sicily, 1102; and there are other deeds of Sicilian kings, of the 12th c., upon the same material. There is extant at Vienna a charter of Emperor Frederick II., granted 1228 to a convent of nuns in Goess, Styria, and written on cotton paper. The practice of making a distinctive water-mark on the P., by means of an impression on the fine sieve of threads or wires upon which the floating pulp is received, was also of very early date, as MSS. as old as the 13th c. bear it. But there is really no satisfactory information respecting the exact time or place of the introduction of paper-making into Europe; by some it is supposed that Spain was the first to receive the art, and that thence it spread to France and Holland, and afterward to England.

Toward the end of the 14th c., P. was in use throughout w. Europe for all literary purposes; and during the

century following gradually superseded vellum. The records of Merton College, Oxford, Eng., show that paper was used 'for a register' 1310. In the British Museum is a MS., written in England 1309, upon P. made of cotton with apparently an admixture of rag. The first maker of P. in England whose name is known was one Tate: he is said to have set up a mill in Hertford early in the 16th c.; there was a P.-mill at Dartford 1588. Small folio P. was sold in England about the middle of the 14th c. at from 3 to 4 pence a quire; in the beginning of the 16th c., from 2 to 3 pence. Brown P. was used in England at least as early as 1570; blotting-P. is mentioned as early as 1465. The first P.-mill in America was erected 1690 by William Rittenhouse in Roxborough, now within the corporate limits of Philadelphia.

The stock used in the manufacture of fine P. was commonly linen rags, but sundry other materials have been employed for a long time. The list of substances proposed for use as material for P. is a long one; it comprises: aloe fibre, asbestos, bagging or sacking, banana fibre, barks of various kinds, bass or bast, bean-stalks etc., cane (sugar), cocoa-nut fibre, cocoa-nut kernel, clover, cotton, dung, esparto or alfa, flax, New Zealand flax, fresh-water weeds, fur, grasses, gutta-percha, hair, hay, heath, hemp, hops and hop-lines, husks of grain, jute, leather, leaves, maize, husk, and stems, Manilla hemp or plantain fibre, moss, nettles, old writing-paper, pea-stalk, peat or turf, roots of various kinds, sawdust, sea-weeds, silk, straw, tan (spent bark), thistle-down, thistles, tobacco-stalks, wood, wool, and wrack grass or zostera.

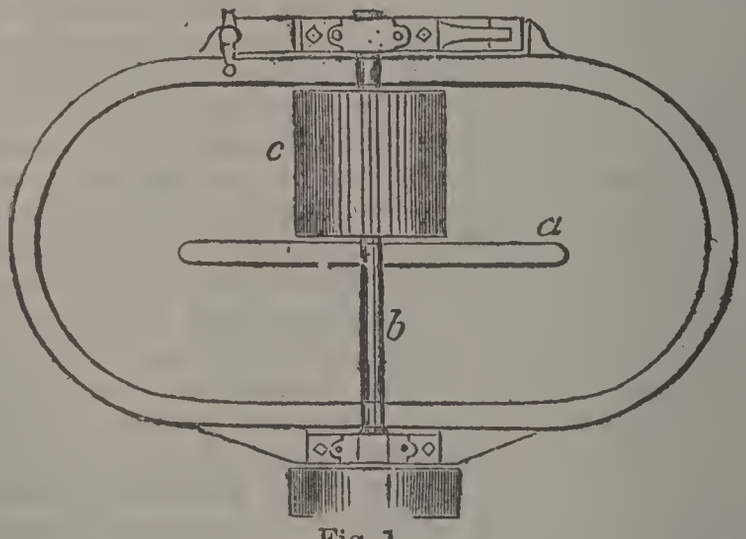


Fig. 1.

But whatever the material employed, the process for nearly all is the same. The rags, bark, fibres, or other substance, have to be reduced with water into a fine, smooth pulp. This, in the early stages of the manufacture, was accomplished by macerating and boiling the material, until, in the case of bark, fibres, or other raw material, the fibres could be drawn out from the cellulose matter, after which it was beaten with mallets, or with pestles in mortars, or stampers moved by some

power. The beating is continued until the material is reduced to a very smooth pulp. The pulping, in machine paper-mills, is much more rapidly accomplished by boiling the linen or cotton rags, or other material, in a strong lye of caustic alkali. This effectually cleans the rags; and other vegetable fibres are softened and separated in a remarkable manner by it; they are then put into the washing-machine (fig. 1), which washes out dirt. This machine (figs. 1, 2, and 3) is a large cast-iron vessel, usually about 10 ft. long, $4\frac{1}{2}$ ft. wide, and $2\frac{1}{2}$ ft.

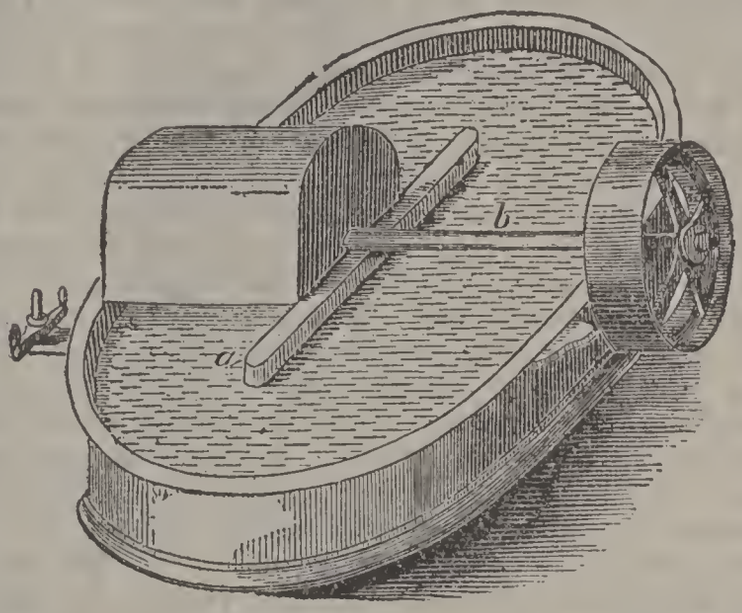


Fig. 2.

deep. It is half-filled with water, and packed with the rags or other material. In the middle of the trough, occupying about two-thirds of its length, is a partition, always cast with it, called the mid-feather, *a* (figs. 1 and 2), to support the axle or driving-shaft, *b* (figs. 1 and 2). This turns the cylinder, *c* (fig. 1), which has a large number of teeth or ridges running across it, which grip and tear the rags, or other materials, as they are drawn under it by the current formed by its revolutions. To

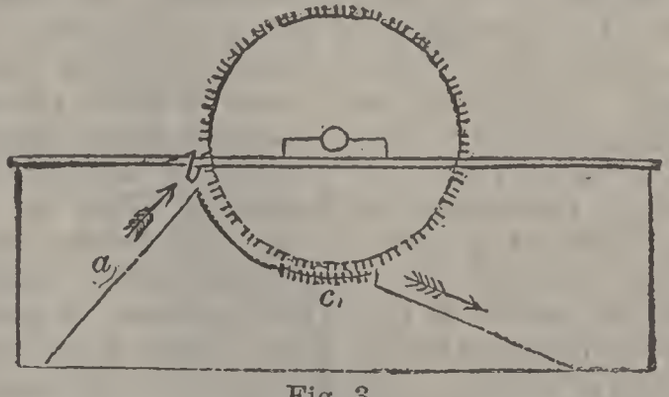


Fig. 3.

facilitate this, a peculiar form is given to the bottom of the part in which the cylinder works, as seen in fig. 3. The rise, *a* (fig. 3), is called the back-fall, and the materials are drawn up to and through the narrow space at *b* by the current; then, as they pass over the ridged

surface, *c*, they come in contact with the ridged surface of the cylinder, and are thus violently ground and drawn through, the stream carrying them round and round until they are thoroughly washed and partly pulped, or, as it is technically called, *broken in*. The machine is supplied with a continued flow of clean water, and the soiled water as regularly escapes through a fine gauze screen, in the ends of the cylinders, in which is an ingenious arrangement for raising it and carrying it away through the axis, which is hollow. The contents of the washing-machine are then allowed to flow out through a large valve, opening downward into the draining-chest. Here the water is drained away, and the *stuff* is then placed in the bleaching-vats of stone, each calculated to contain a hundredweight of stuff, which is here submitted to the action of a strong solution of chloride of lime for about 24 hours, and frequently agitated; after which it is transferred to a hydraulic press, and pressed so as to remove the greater portion of the liquid and chloride of lime. It is then placed in another washing-engine, and for an hour is submitted to the same process as in the first; by which all vestiges of the bleaching materials are removed, and the stuff so much more broken down as to be called *half-stuff*. From this engine it is let out by a valve, and finds its way into the *beating-engine*, which is placed at a lower level to receive it. Here the arrangement is nearly the same as in the washing and intermediate engines; but the ridges on the bars below the cylinder, and on the cylinder itself, are much sharper, and the disintegration of the fibres is carried on with great rapidity until they are quite separated; and the flow of the water in a rapid current, as it passes the cylinder, draws them out and arranges them in the water in much the same way as wool or cotton is laid on the carding-cylinders of a carding-machine. This operation takes about five hours, at the end of which time the materials have been worked up with the water into an almost impalpable pulp. This is then let out into the pulp vat, where it is kept continually agitated by a wooden wheel revolving in it, called a *hog*, the loading material—china clay or pearl white—being in the mean time added. The sizing, too, is added while the stuff is in the beating-engine. Sizing consists in the deposit on the fibres of a mixture of resin-soap and alum—the former being produced by dissolving resin in caustic soda and allowing the mixture to cool, when the soap rises to the surface. This is dissolved in water, and starch is often added to it. The mixture is now thoroughly incorporated with the pulp, which is next treated with solution of alum. Thus a finely divided precipitate of resinate of alumina is deposited on the fibres. After the sizing, the pulp is ready for coloring; even to produce a pure white, color must be added to the pulp. In general, for white papers, either cochineal and ultramarine blue are employed, or magenta and aniline blue. In American mills the stuff is kept for a much longer

time in the beating-engine than it is in England; hence the product is of superior quality. The pulp is now formed and ready for the P.-machine, unless it is to be manufactured by hand—a process now used only in the manufacture of the most expensive kinds of writing and drawing papers. The operations in hand-manufacture and in machine-work are in all essential particulars the same, but more minute care can be exercised in the former process, and specially selected materials only are used.

It is usually stated that Louis Robert, a Frenchman, invented the paper-machine, and that it was brought to England by Didot of Paris in an imperfect state, but received improvements from Fourdrinier. But it must not be overlooked that Bramah took out a patent 1805, rather more than a year before Fourdrinier, for improvements very similar to those described in Fourdrinier's specification. The object of all was to cause an equal supply of the pulp to flow upon an endless wire-gauze apron, which would revolve and carry on the paper until it is received on an endless sheet of felt, passing around and between large couching-cylinders. These machines have now been brought to such perfection, that paper can be made in one continuous web of any length; and before leaving the machine, is sized, dried, calendered, hot-pressed, and cut into sheets.

Fig. 4 is a side view of a modern Fourdrinier machine, and Fig. 5 a vertical one. The principle of the machine is very simple; it contains a pulp vat, A (figs. 4 and 5), with a hog or wheel inside to agitate the pulp, and an arrangement for pouring the pulp over the wire-gauze mold, B, B, B, B, which is an endless sheet moving round two rollers, *a*, *b*, which keep it stretched out and revolving when in operation. Under the part which receives the pulp, there is a series of small brass rollers, *d* (fig. 4); these, being nearly close together, keep it perfectly level, which is a most necessary condition; besides which, there is a shallow trough, *ee* (fig. 4), called the *save-all*, which catches and retains the water, which always escapes with some pulp in suspension; and an arrangement of suction boxes and tubes, *f*, *f*, *f* (fig. 4), worked by air-pumps, which draw much of the water out as the pulp passes over them. The pulp is kept from running over the sides by straps called the *deckles*, which are also endless bands, usually of vulcanized India-rubber, carried round moving rollers, so that they travel with the wire-gauze, and therefore offer no resistance to it. In addition to all this, the frame-work on which the surface of the wire-gauze rests has a shogging motion, or side-shake, which has an important effect in working the fibres together before the pulp finally settles down. When it reaches the *couching-rolls*, which press out most of the remaining moisture, and carry it forward to the first and second series of press-rolls by means of an endless web of felt which passes round them, the speed of these rollers

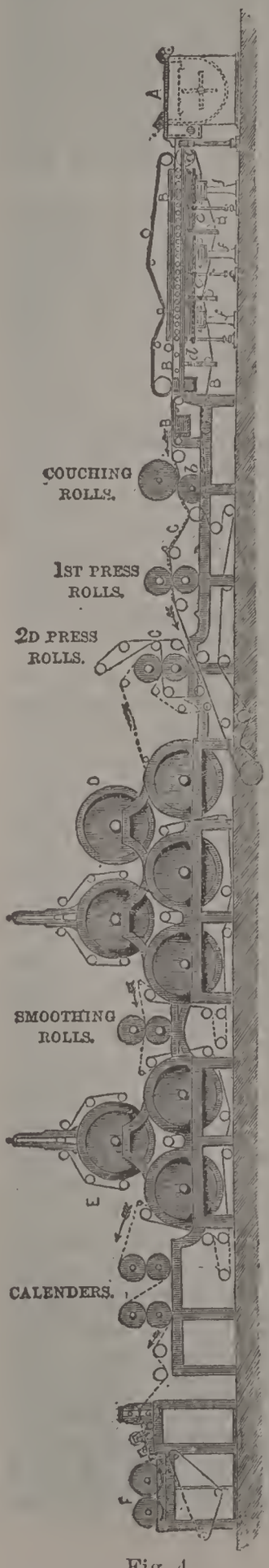


Fig. 4.

and the travelling sheet of felt, C, C (figs. 4 and 5), is nicely calculated, so as to prevent a strain upon the still very tender web of paper. Sometimes the upper rollers of these two series are filled with steam, in order to commence drying the web. The paper is now trusted to itself, and passes on, as indicated by the arrows, from the second press-rolls to the first set of *drying-cylinders*, D, D (figs. 4 and 5), where it again meets with a felt sheet, which keeps it in close contact with the drying-cylinders, which are of large size, and filled with steam. Around these it passes, drying as it goes; is then received between the two *smoothing-rolls*, or damp calenders, which press both surfaces, and remove the marks of the wire and felt, which are until then visible on the paper. This is necessarily done before the drying is quite completed; and from the smoothing-rolls it passes to the second series of drying-cylinders, E (figs. 4 and 5), where the drying is finished, and thence to the calenders, which are polished rollers of hard cast-iron, so adjusted as to give a considerable pressure to the paper, and at the same time a glossiness of surface. For writing-papers, the paper passes through a shallow trough of size after leaving the drying-cylinders, and then passes over another series of skeleton cylinders, with fans moving inside, by which it is again dried without heat, and afterward passes through the calenders. Still following the paper web in the drawing (fig. 4), it is seen to pass from the calenders to another machine, F; this slits the web into widths, which are again cross-cut into sheets, the size of which is regulated at will. The water-mark is impressed on machine-made paper by means of a fine light-wire cylinder with a wire-woven pattern; this is placed over the wire-gauze sheet upon which the pulp is spread, but near

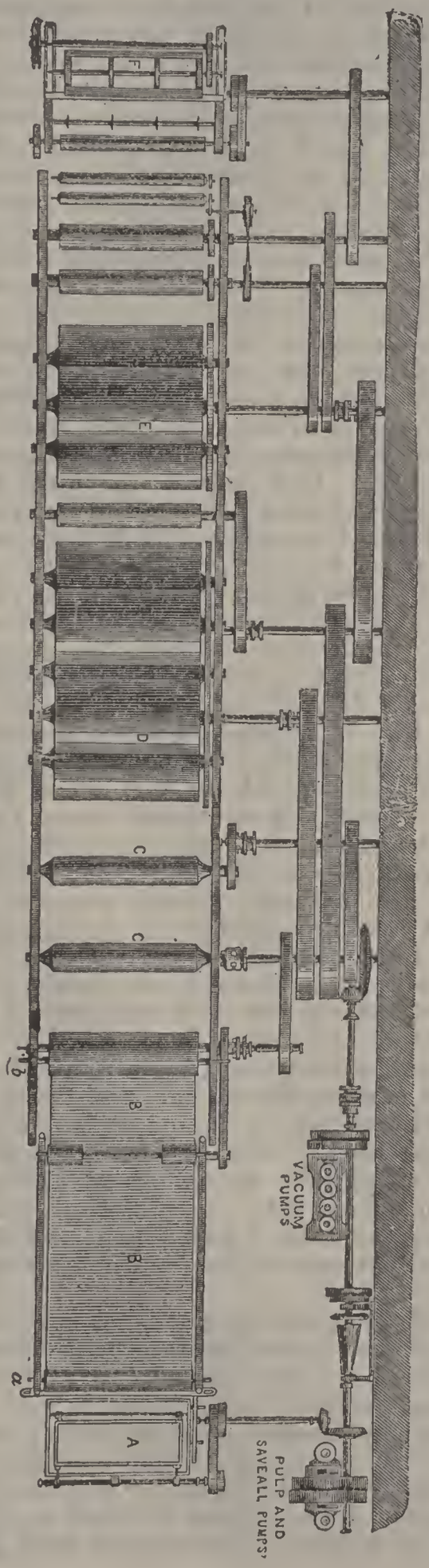


Fig. 5.

the other end of it, so that the light impression of the marker may act upon the paper just when it ceases to be pulp; and this remains all through its course. There are many other interesting points about the paper-machine, but their introduction here would rather tend to confuse the reader. The speed of the American P.-machines is enormous—equal to the production, every minute, of 250 lineal ft. of P. of the full width of the machine. The process of P.-making has been further accelerated in this country by introduction of what are called refining-engines, for preparing the pulp, and by essential improvements in the calenders.

For the manufacture of wrapping-papers, binders' boards, wall-papers, and inferior sorts of newspaper, the cylinder-machine is much used in the United States, instead of the Fourdrinier; it costs less and can be operated more economically, but the P. produced has far less tenacity. The cylinder-machine is so called from the cylinder, which here takes the place of the wire mold of the Fourdrinier; it is a frame of metal usually $2\frac{1}{2}$ to $3\frac{1}{2}$ ft. diameter, and in length equal to the width of the P. to be made. The frame is covered first with a jacket of coarse wire-cloth, and then with one of very fine wire-cloth, which serves the purpose of the Fourdrinier wire-cloth mold. The cylinder revolves in a vat filled with diluted pulp, the water in which constantly flows into it, leaving on the wire-cloth a film of pulp, and passing out at the ends of the cylinder through an opening in each side of the vat, below the centre of the cylinder. There is a couch-roll above the cylinder, of the same length as the latter, and revolving with it; between the two runs an endless woolen felt; this, after contact with the cylinder (which rises a few inches above the vat and the diluted pulp), passes round the couch-roll to a first pair of rollers. The film of pulp on the cylinder adheres to the felt; the couch-roll, bearing with some weight on the cylinder, presses out of the pulp some of its water; more is pressed out by the first pair of press-rolls; whence it passes to another pair, and the process is continued as in the Fourdrinier machine. The reason why cylinder-machine P. is not as strong as Fourdrinier-machine P. is that, whereas in the latter the 'side-shake' makes the fibres fall in all directions, in the cylinder-machine they run mostly in one direction. A machine, invented by James Harper, of New Haven, combines the features of the Fourdrinier and cylinder machines.

The method of grinding wood for making pulp was introduced into the United States about 1870; within 10 years the price of a certain grade of printing-P. fell from 9 to 4 cents per pound.

By chemical treatment of wood, what is known as 'wood-fibre' is produced, which yields a P. more tenacious than that produced from 'wood-pulp.' 'Wood-fibre' is obtained by reduction of wood to its pure fibre, or cellulose, by boiling and treatment with strong alka-

fur solutions; another process consists in treating wood under pressure with sulphurous acid solution in presence of a base. The resulting pure fibre is used for writing and printing papers of different grades. A process for coating P. so as to give it a highly finished surface for book-work is used in P.-mills in the United States; the coating is applied after the P. has passed through the usual processes of the P.-machine. P. thus prepared is valuable specially in production of wood-cut or photo-electrotype engravings. There were in the United States 1888 about 1,100 P. and pulp mills; in Canada 62; in Mexico 11 P.-mills. The statistics of P.-manufacture in the United States 1890 showed capital $82,374,099; paper made more than 900,000 tons; value of product $74,309,388; number of employes 29,568; wages $13,746,584; value of materials was $42,223,314; 32 varieties, as book, news, writing, envelope, drawing, bank-note, manilla, straw, tissue, etc., were enumerated.

The following are the principal styles of ordinary P., and the sizes of the sheets, given in inches:

1. *Writing and Printing Papers:*

Pot	15 x 12½	Medium	23 x 18
Double Pot	25 x 15	Royal	24 x 19
Flat Cap	17 x 14	Printing Royal	25 x 20
Foolscap	16½ x 13⅓	Super-royal	28 x 20
Sheet-and-third Foolscap	22⅓ x 13¼	Super-royal Printing	27 x 21
Sheet-and-half "	22½ x 13¼	Imperial	31 x 23
Double "	27 x 17	Atlas	33 x 26
Post	18¾ x 15¼	Columbier	34 x 23
Large Post	20¾ x 16½	Elephant	28 x 23
Medium Post	22½ x 18	Double Elephant	40 x 27
Double "	30½ x 19	Antiquarian	53 x 31
Copy	20 x 16½	Double Cap	28 x 17
Crown	19 x 15	" Demy	32 x 21
Double Crown	30 x 20	" "	42 x 16
Demy	21 x 16	" Medium	46 x 18
Printing Demy	22½ x 17¾	" "	36 x 23
Medium "	22 x 17½	" Royal	38 x 24
Medium Printing Demy	23 x 18½	Emperor	4 ft. x 6 ft

These sizes are somewhat lessened by plowing and finishing off the edges previous to sale.

2. *Coarse Papers for Wrapping and Other Purposes.*—*Kent-cap*, 21 by 18; *Bag-cap*, 19½ by 24; *Havon-cap*, 21 by 16; *Imperial-cap*, 22½ by 29; *Double 2-lb.*, 17 by 24; *Double 4-lb.*, 21 by 31; *Double 6-lb.*, 19 by 28; *Cartridge*, *Casing*, and *Middle-hand*, etc., 21 by 16; *Lumber-hand*, 19½ by 22½; *Royal-hand*, 20 by 25; *Double Small-hand*, 19 by 29.

Purple papers of a soft texture, unsized, are used in very large quantities by sugar-refiners, of the following sizes: *Copy-loaf*, 16¾ by 21¾; *Powder-loaf*, 18 by 26; *Double-loaf*, 16½ by 23; *Single-loaf*, 21½ by 27; *Lump*, 23 by 33; *Hambro'*, 16½ by 23; *Titler*, 29 by 35; *Prussian*, or *Double Lump*, 32 by 42.

Blotting and Filtering Paper.—This is unsized P. of good quality, and frequently with some color, and of the same size as demy.

Besides these well-known trade definitions, there are very many others, amounting, if we include *paste* and *mill boards*, to at least 12 or 15 hundred, so that even paper-manufacturers require the aid of a treatise on the subject of the sizes, qualities, etc., and such a treatise is in common use.

Even as regards materials, varieties are endless. In an old German book by Jacob Christian Schäffers, pub. Regensburg 1772, there are no less than 81 samples of different kinds of P. bound up and forming part of the book, and innumerable others have been made since.

Rice P. is a beautiful material imported from China, about which numberless errors have been written. It is now known to be formed of thin slices of the pith of the plant called *Aralia papyrifera*. This pith can be obtained from the stems in beautiful cylinders, one to two inches in diameter, and several inches in length. The Chinese workmen apply the blade of a sharp, straight knife to these cylinders of pith, and, turning them round dexterously, pare them from the circumference to the centre, making a rolled layer of equal thickness throughout. This is unrolled, and weights are placed upon it until it is rendered perfectly smooth and flat. Sometimes a number are joined together to increase the size of the sheets. It will be seen that this more nearly resembles the ancient papyrus than modern P; but it is more beautiful than the former, being a very pure pearly white, and admirably adapted to the peculiar style of painting of the Chinese.

The ordinary papers of the Chinese, Japanese, and East Indians have much resemblance to each other, which arises from the manufacture and material being similar; the bark of the paper mulberry (*Broussonetia papyrifera*) being chiefly used. The Chinese and Japanese are the most skilful paper-makers in the world, and some of the East Indian papers surpass the European manufactures completely.

Some useful kinds of P. are the result of manipulations subsequent to the paper-maker's work. Thus:

Lithographic Paper is prepared from good printing-paper by laying on one side of the sheets a preparation consisting of six parts of starch, one of alum, and two of gum-arabic dissolved in warm water, and applied while hot with a proper brush. Generally a little gamboge is added, to give it a slight yellow color.

Copying Paper, for manifold-writers, is made by applying a composition of lard and black lead to one side or both of sheets of writing-paper; and after leaving it on for a day or so, it is carefully and smoothly scraped off and wiped with a soft cloth.

Tracing Paper is good printing-paper rendered transparent by brushing it over with a mixture of Canada balsam and oil of turpentine, or nut oil and turpentine: in either case it must be carefully dried before using.

There are two distinct classes of colored papers. In one, the color is introduced into the pulp, and is conse-

quently in the body of the P.; in the other, the colors are mixed with size, and applied to the surface. There have been many ingenious and tasteful inventions for decorating the surface of P., such as by giving it a marbled and even a beautiful iridescent appearance.

P. is subject to much adulteration. China-clay and gypsum are generally used for the white sorts, and the heavy ferruginous ochres for the coarse and brown kinds.

PAPER-HANGINGS: webs of paper, *papiers peints* of the French, usually decorated, with which interior walls are often covered. Previous to the invention of the paper-machine, sheets of paper of the size called *Elephant*, 22 by 32 inches, were pasted together, to make 12 yard lengths, before the pattern was imprinted; but this is now rendered unnecessary by the facility of making webs of any length. Upon the paper it is usual first to spread a ground-color with proper brushes, taking care to produce a perfectly smooth surface. The colors employed are opaque, and are mixed with size, sometimes also with starch, and most of the ordinary pigments are used. In the early stages of the art, it was usual to have the patterns stencilled (see STENCILLING) on the ground-color. The stencilling plates were usually pieces of pasteboard, one being required for every differently colored portion of the pattern. Afterward, wooden blocks were adopted, similar to those used in calico-printing, made of pear or poplar wood, generally the width of the paper, forming, indeed, huge wood-cuts, on which the pattern is in high relief. As many blocks are required as there are colors in the pattern, each bearing only so much of the pattern as is represented by the color to which it is assigned. Of course the whole beauty of the work depends on the nice adjustment of one portion of the pattern to another; and this is determined by guide-pins in the blocks, which are so managed as not to disfigure the surface with their points. The pattern-block, being coated with its particular color from the color-tub, is laid on the paper, which is stretched out for the purpose on a table, and a lever is brought to bear upon it with sufficient pressure to make the whole of the block bear equally upon the paper. When one block has been printed the whole length of the paper by a succession of impressions, the piece is taken to the drying-room, and dried, previous to receiving the next color; and it often happens that the same operations have to be repeated a dozen different times before the pattern is completed. This process is now largely superseded by the cylinder printing-machines, which are of the same kind as are used in printing textile fabrics. In these machines, the pattern is engraved on a series of copper cylinders, and each part or color has a separate cylinder, and an arrangement for keeping it constantly supplied with color when working. The cylinders are so arranged as, by the sum of their revolutions, to make the pattern complete; so that as the web

of paper passes the first, it receives the color for one portion of the pattern, and reaches the second in exact time to have the next color applied in the right places. In this way the entire piece occupies only a few seconds in receiving the complete decoration.

The polished or glazed papers have the ground prepared with gypsum or plaster of Paris, and the surface dusted with finely powdered steatite, or French chalk. When perfectly dry, this is rubbed hard with a burnishing-brush, until the whole is evenly polished. This is done usually before the pattern is printed, but in some cases pattern and ground both are polished. In making the *flock-papers*, the printing is done in the same way as in the block-printing, only, instead of colored material, a composition called *encaustic* is printed on: it consists of linseed-oil, boiled with litharge, and ground with white lead; sufficient litharge is used to make it dry quickly, as it is very adhesive. The flock is prepared from the shearings of woolen cloths from the cloth-mills, by washing and dyeing the shearings to the various colors, then stove-drying and grinding them in a peculiar mill, which, in their brittle state, after leaving the stove, breaks them short. After this they are sifted, to obtain various degrees of fineness. By nice management, the prepared flock is so sprinkled over the whole of the printed surface as to coat the encaustic, and adhere evenly and firmly to it. The same adhesive material is used for printing in gold and other metals. The pattern being printed with the encaustic, gold or other metallic leaf is applied, and, when it is properly fixed, the loose metal is brushed away with a hare's-foot or other soft brush. Some of the finest French papers have much of the pattern actually painted in by hand, a process which, of course, renders them very costly.

PA′PER MUL′BERRY: see MULBERRY.

PA′PER NAU′TILUS: see ARGONAUT.

PAPETERIE, n. *păp′ĕ-trē* [F. a paper-mill]: a case containing paper and other writing materials.

PAPHIAN, a. *pā′fĭ-an:* of or pertaining to Paphos, a city of Cyprus sacred to Venus; pertaining to or connected with Venus or her worship.

PAPHLAGONIA, *păf-la-gō′nĭ-â:* anciently, a province of Asia Minor, extending along the s. shores of the Black Sea, from the Halys on the e. to the Parthenius on the w. (which separates it from Bithynia), and extending inland s. to Galatia. Its limits, however, were different at different times. The Paphlagonian mountains were covered with forests, and the inhabitants were famous hunters. Crœsus made P. a part of the kingdom of Lydia, and Cyrus united it to Persia; it subsequently became part of the empire of Alexander the Great, and afterward of the kingdom of Pontus, was included in the Roman province of Galatia, and in the 4th c. of the Christian era was made a separate province by Constantine. Its cap. was Sinope. The Paphlagonians

are supposed to have been of Syrian, or at least of Semitic, origin, like the Cappadocians. They were proverbially rude, coarse, and deficient in understanding; but this probably refers only to the rustics in the interior.

PAPHOS, *pā′fos* or *păf′os:* anciently, the name of two cities in the isle of Cyprus.—The older city, called sometimes *Palaipaphos* (now *Kuklos* or *Konuklia*), was in the w. part of the island, about $1\frac{1}{4}$ m. from the coast. It was founded probably by the Phœnicians, and was famous, even before Homer's time, for a temple of Venus, who was said to have risen from the sea close by, whence her epithet *Aphrodite*, 'foam-sprung,' and who was designated the Paphian goddess. This was her chief residence, and hither crowds of pilgrims used to come in ancient times.—The other Paphos, called *Neopaphos* (now *Baffa*), was on the sea-coast, about seven or eight m. n.w. of the older city, and was the place in which the apostle Paul proclaimed the gospel before the proconsul Sergius.

PAPIAS, *pā′pĭ-as*, Bishop of Hierapolis in Phrygia: Christian writer, in the 2d c. The *Paschal* or *Alexandrian Chronicle* states that he suffered martyrdom at Pergamus 163. According to Irenæus, he was a disciple of the apostle John; but Eusebius, who quotes (*Historia Ecclesiastica*, chap. 39) the words of Irenæus, immediately subjoins a passage from P. himself, in which the latter distinctly states that he did not receive his doctrines from any of the apostles, but from the 'living voice' of such followers of theirs as 'are still surviving.' He was, however, an 'associate' of Polycarp, a bishop in the same province of proconsular Asia; and as the latter was a disciple of the apostle John, it is probable that Irenæus—a somewhat hasty writer—inferred that his companion must have been the same. Eusebius describes P. as 'well skilled in all manner of learning, and well acquainted with the Scriptures;' but a little further on, he speaks of him as a man 'of limited understanding' (*smikrὸs ōn tὸn noûn*), and a very credulous chronicler of 'unwritten tradition,' who had collected 'certain strange parables of our Lord and of his doctrine, and some other matters *rather too fabulous.*' The work in which these were contained was *Logiōn Kuriakōn, Exegêseōs Biblia E′* (Five Books of Commentaries on the Sayings of our Lord). It is now lost, but certain fragments of it have been preserved by Irenæus, Eusebius, Maximus Confessor, and other writers. These fragments are extremely interesting, because of the light which they throw on the origin of the New Testament Scriptures; and their importance may be estimated from the fact that they contain our earliest information on the subject. It is P. who is our authority for the statement that the evangelist Matthew drew up a collection of our Lord's sayings and doings (*ta logia*) in the Hebrew (probably Syro-Chaldaic or Aramaic) dialect, and that every one translated it as he

was able. There can be no doubt that this is a perplexing statement, suggesting as it does the delicate question: 'If Papias is correct, who wrote our present Matthew, which is in Greek, and not in Hebrew?' (For a consideration of this point, see MATTHEW.) P. tells us also, either on the authority of John the Presbyter, or more probably on that of one of his followers, that the evangelist Mark was the interpreter (Hermeneutes) of Peter, and wrote 'whatsoever he [Peter] recorded, with great accuracy.' But the passage is far from implying that Mark was a mere amanuensis of Peter, as some have asserted, but only, as Valesius has shown, that Mark listened attentively to Peter's preaching, culled from it such things as most strictly concerned Christ, and so drew up his gospel. P., it remains to be said, was an extreme millenarian: see MILLENNIUM.

PAPIER-MACHÉ, n. *păp-yā'-mâ-shā'* [F. *papier*, paper; *mâcher*, to chew, to masticate]: paper reduced to a pulp, molded into any variety of form, and afterward japanned. This manufacture has certainly been in use for more than a century in Europe; but probably it was suggested first by some of the beautiful productions of Sinde and other parts of India, where it is employed in making boxes, trays, etc., as well as in China and Japan. Its first application, as far as we know, was to the manufacture of snuff-boxes by a German named Martin, 1740, who learned it of a Frenchman named Lefevre: but the French say that he learned the art in England. Properly speaking, P.-M. is paper-pulp molded into shape, and it has been used not only to make small articles, such as boxes, trays, etc., but in the interior decoration of houses, for cornices, ceilings, etc. The ceilings in Chesterfield House, and some other fine Elizabethan structures, are made of this material, which at one time, owing to a combination of the stucco-workers to raise the price of their labor, took the place almost entirely of stucco in house ornamentation. At present, a combination of both stucco and paper is similarly employed under the name *Carton-pierre*. From the extension of the applications of P.-M. to the manufacture of a number of light and useful articles, modifications have taken place in its composition, and it is now of three kinds—1st, the true kind, of paper-pulp; 2d, sheets of paper pasted together after the manner of pasteboard, but submitted to far greater pressure; 3d, sheets of thick mill board cast from the pulp, also heavily pressed. The term P.-M. is in trade held to apply rather to the articles made of the pulp than to the pulp itself; and a vast manufacture has sprung up during the 19th c., particularly in Birmingham, in which a great variety of articles of use and ornament are made of this material. They are coated with successive layers of asphalt varnish, which is acted upon by heat in ovens until its volatile parts are dissipated, and it becomes hard, and capable of receiving high polish. Mother-of-pearl is much used in their decoration, for which purpose, when several

layers of the varnish still remain to be applied, thin flakes of the shell of the form of the pattern are placed on the varnish, and are covered by the succeeding layers, giving rise to elevations where they are hidden by the coats of varnish. The surface is then ground down smooth and polished, and the grinding down brings to light the pieces of mother-of-pearl shell, which thus present the appearance of inlaid patterns. The fine surface which can be given to the asphalt varnish also permits of burnished gilding and other decorative applications with excellent effect.

PAPIER-VERGÉ, n. *păp-yā′-vėr-zhā′* [F. *papier*, paper; *vergé*, streaky]: laid paper.

PAPILIO, n. *pă-pĭl′ĭ-ō* [L. *papilĭō*, a butterfly]: the butterfly tribe—a genus of insects (see BUTTERFLY). PAPIL′IONA′CEOUS, a. *-nā′shŭs*, resembling a butterfly; applied to plants of the leguminous order, as the pea, from the butterfly shape of their flowers. PAPILIONA′CEÆ: sub-order of the nat. order of plants generally called *Leguminosæ* (q.v.).—The plants of this sub-order are the only plants known which have flowers of the peculiar structure called *Papilionaceous* (q.v.), and of which the Pea and Bean afford familiar examples. Papilionaceous flowers have five petals, imbricated in estivation (bud), one of which, called the *vexillum* or *standard*, is superior, turned next to the axis, and in estivation folded over the rest; two, called the *alæ*, or *wings*, are lateral; and two are inferior, often united by their lower margins, forming the *carina* or *keel*. The number of Papilionaceæ is great—about 4,800 species being known. They are found in all parts of the world, abounding in the tropics. Many have superb and beautiful flowers; many are plants of beautiful form and foliage, trees, shrubs, or herbaceous plants; many possess valuable medicinal properties; and many are of great importance as furnishing food for man and for domestic animals, while others furnish dyes, fibre, timber, etc. See BROOM: LABURNUM: CLOVER: LEAN: PEA: LUCERN: LICORICE: INDIGO: SANDAL-WOOD: ETC.

PAPILLA, n. *pă-pĭl′lă*, PAPIL′LÆ, n. plu. *-lē* [L. *papilla*, a small pimple, a nipple: It. *papilla:* F. *papille*]: the nipple of the breast: minute elongated conical processes or elevations, projecting from the surface of the true skin into the epidermis of the tongue, the palm, or surface of the fingers, etc., being the terminations of the nerves, highly vascular and nervous in their character, and taking an active part in the senses of touch and taste. For their form and structure, see SKIN. The mucous membrane of the tongue contains three varieties of papillæ: see TASTE, ORGAN AND SENSE OF. PAPILLARY, a. *păp′ĭl-lėr-ĭ*, or PAP′ILLOUS, a. *-lŭs*, pertaining to a nipple or the papillæ; covered with papillæ. PAP′ILLATE, v. *-lāt*, to grow into a nipple. PAP′ILLOSE, a. *-lōs*, or PAP′ILLATED, a. *-lĕd*, nipply; in *bot.*, covered with fleshy dots, as the stems of certain plants; warty.

PAPILLOMA, n. *păp'il-lō'mă*, PAPILLOMATA, n. plu. *păp'il-lō'mă-tă* [a new L. formation from *papilla*, a teat or nipple]: papillary growths, also called epidermic and epithelial tumors, from their seat in the body; they constitute a well-marked class of new formations, of which warts are instances.

PAPILLOTE, n. *păp'il-lōt* [F. a dim. of *papillon*, a butterfly]: a curl-paper.

PAPIN, *păp'ĭn*, F. *pâ-păng'*, DENIS: French physicist: 1647, Aug. 22—1712; b. Blois. He practiced medicine for a time at Paris, but turned his attention to physical sciences, assisted Huygens in the construction of the air-pump, and during a visit to England was admitted a fellow of the Royal Society. Being a Protestant, the revocation of the Edict of Nantes prevented his return to his native country, and on leaving England he settled at Marburg, in Germany, in 1687, as professor of mathematics. But he again came to England in 1707. The real importance of Papin's many researches and experiments was long unperceived. He invented the double air-pump and the air-gun, a 'digester' for cooking by means of liquids under produced atmospheric pressure, and the safety-valve, first used in the 'digester.' In 1690 he constructed the first steam-engine with a piston, and in the same year a boat with a paddle wheel revolved by a water-wheel supplied by means of a pumping-engine. Consult: Thurston, *Growth of the Steam Engine* (1878).

PAPINEAU, *pâ-pē-nō*, LOUIS JOSEPH: Canadian politician: b. Montreal, P. Q., 1789, October; d. Montebello, P. Q., 1871, Sept. 23. He was educated at the Seminary of Quebec, studied law, and was admitted to the bar in 1812, but while still a student in 1809 he was elected to represent Kent in the Canadian assembly. During the War of 1812 he was captain of militia. In 1811 he had succeeded his father as member of assembly for one of the districts of Montreal and in 1817 he was elected speaker, which office he held for 20 years as leader of the French-Canadian party. He was continually at variance with the royal governors and in 1827 Lord Dalhousie adjourned parliament and resigned rather than allow Papineau to take his seat as speaker. He disapproved the union of Upper and Lower Canada and in 1834 framed the 'Ninety-two Resolutions' which were sent to England in exposition of the grievances and demands of his party. In 1834 he consulted with William Mackenzie, the revolutionary leader of Upper Canada, regarding the consolidation of their forces and in 1837 was deprived of his office of captain in the militia. In that year he attended the meeting in which a revolution was decided upon, and a warrant was issued for his arrest for high treason, though he had fled to the United States at the outbreak of the rebellion. He escaped to France, but was pardoned in 1847 and returned to Canada. He again entered parliament, but finding himself without influence retired in 1854.

PAPINIAN, *pa-pĭn′ i-an* (L. PAPINIANUS, *pa-pĭn-i-ā′-nŭs*), ÆMILIUS PAULUS: most celebrated of Roman jurists: b. toward the middle of the 2d c.; d. sometime after 212. During the reign of Emperor Severus (q.v.), whom he succeeded as *Advocatus Fisci*, and whose second wife is said to have been P.'s relative, he held the office of *Libellorum Magister;* and afterward that of *Præfectus Prætorio.* After the death of Severus, his son and successor, Caracalla, dismissed P. from his office, and soon afterward caused him to be put to death on various pretexts; the real reason, however, appearing to be that the emperor was afraid that the influence of a man so able and upright would be dangerous to his power. P.'s works consist chiefly of 37 books of *Quæstiones*, 19 of *Responsa*, 2 of *Definitiones*, two works, *De Adulteriis*, and a Greek fragment; and from these there are 595 excerpts in the Digest (see PANDECT). The pupils of P. include the most famous names in Roman jurisprudence, e.g., Ulpian, Paulus, Pomponius, Africanus, Florentinus, and Modestinus; but the master stands superior to them all. His high reputation among his contemporaries and successors may be gathered from the epithets *Prudentissimus*, *Consultissimus*, *Disertissimus*, bestowed on him by various emperors, and from the first book of the Codex Theodosii, *De Responsis Prudentum*, in which, after declaring the works of P., Paulus, Caius, Ulpian, Modestinus, and four others, to be authority for a judge's decision, it is declared that should these jurists be equally divided in opinion, that opinion which was maintained by P. was to be considered right; while his commentator, the famous Cujacius (q.v.), goes so far as to declare that 'P. was the first of all lawyers who have been, or are to be,' and that 'no one ever will equal him.' His high reputation as a jurist was greatly enhanced by the strong moral feeling and unbending honesty which were characteristic of him, and which have stamped his works with an ineffaceable impress. P.'s works were studied both before and after Justinian's time by Roman legal students of the third year, who were for this reason denominated Papinianistæ. The fragments of P.'s works which remain are somewhat obscure, and the excerpts from them in the Digest are in general so brief that the aid of a commentator is required.

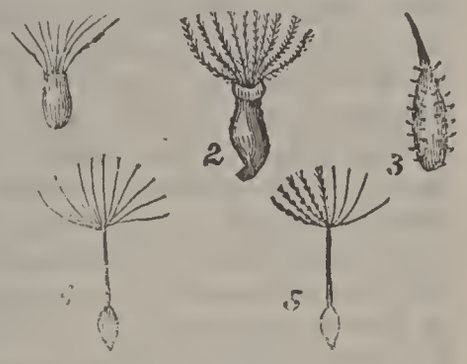
PAPIST, n. *pā′pĭst* [F. *papiste*, a Rom. Cath.—from *Pape*, the pope]: member of the Rom. Cath. Chh. PAPISTIC, a. *pă-pĭs′tĭk*, or PAPIS′TICAL, a. *-tĭ-kăl*, pert. to Rom. Catholics or to popery; popish. PAPIS′TICALLY, ad. *-lĭ.* PAPISTRY, n. *pā′pĭs-trĭ*, the doctrines and ceremonies of the Church of Rome.—All the above terms are in greater or less degree opprobrious and offensive. Literally understood, they indicate the simple fact of adherence to the pope; but in popular use they indicate especially the distinctive doctrines of the Church of Rome in their extremist statement, and in what has been deemed their most violent application.

PAPOOSE, n. *pă-pôz′:* a young child among the N. Amer. Indians.

PAPPENHEIM, *păp′pĕn-hīm*, Gottfried Heinrich, Count von: imperial general of great note in the Thirty Years' War: 1594, May 29—1632, Nov. 7; b. Pappenheim, in Middle Franconia, Bavaria, of a very ancient Swabian family, in which the dignity of Marshal of the Empire became hereditary about the 13th or 14th c., and many of whose members had greatly distinguished themselves in the wars of the middle ages. When about 20 years of age, P. went over to the Rom. Cath. Church, and thenceforth signalized himself by fiery zeal in its cause. After serving under the king of Poland in his wars with the Russians and Turks, P. joined the army of the Catholic League, and in the battle of Prague (1620) stayed the flight of the Austrian cavalry, and by a well-timed and furious charge turned the tide of battle against the Bohemians. In 1623 he received from the emperor the command of a cavalry regiment of the famous 'Pappenheimer Dragoons,' and 1625 became general of the Spanish horse in Lombardy; but in 1626 re-entered the Austrian service, and after suppressing a dangerous revolt of the peasants of upper Austria, in which 40,000 of the peasants perished, he joined the army opposed to the Prot. league, and in association with Tilly carried on many campaigns against the Danes, Swedes, and Saxons. It was P. who urged and induced Tilly to take Magdeburg by assault, and himself led and directed the attack. Moreover, it is he, rather than Tilly, who was to blame for the ferocious massacres which followed. His reckless bravery involved Tilly against his will in the disastrous battle of Breitenfeld; but to some extent he retrieved his character by his strenuous efforts to remedy the loss, and protect the retreat of the army. After Tilly's death, P. was associated with Wallenstein, who detached him with eight regiments to protect Cologne, but, on hearing of the advance of Gustavus, sent an urgent order for his return. P. arrived at Lützen at the moment when Wallenstein's army was on the point of being completely routed, and, at the head of his cuirassiers, charged the left wing of the Swedes, throwing it into confusion, and almost changing the fortune of the battle by his extraordinary bravery. He was mortally wounded in the last charge, and died a few hours afterward at Leipzig, with a smile on his countenance, after learning that Gustavus Adolphus had died before him. 'God be praised!' he said; 'I can go in peace, now that that mortal enemy of the Catholic faith has had to die before me.'

PAPPOUS, a. *păp′pŭs*, or Pap′pose, a. *-pōs* [L. *pappus;* Gr. *pappos*, the woolly hairy seeds of certain plants]: downy, as the seeds of the thistle, the dandelion, etc

PAPPUS, n. *păp'pŭs* [L. (see PAPPOUS)]: appendage of the fruit of plants belonging to certain nat. orders, of which the great nat. order *Compositæ* is the chief. It consists either of simple (figs. 1 and 4) or feathery (figs. 2 and 5) hairs, sessile or stalked, arising from the summit of the fruit, and is produced by a development of the tube and limb of the persistent calyx. Its object appears to be to waft the ripened seed to the new situation in which it is to grow. *Thistle-down* is the pappus of the thistle.—The pappus is represented sometimes by mere teeth or scales.



Pappus:
1 and 2, sessile; 3, scale-like;
4 and 5, stalked.

PAPPUS, *păp'ŭs*, of Alexandria: one of the later Greek geometers, of whose history nothing is known; he is said by Suidas to have lived during the reign of Theodosius the Great, Emperor of the East (379–395). Some writers are of opinion that he lived two centuries earlier, but the former is much the more probable opinion. The chief work of P. is his *Mathematical Collections*, of which the last six, out of eight, books, are extant. The *Collections*, as their name implies, are an assemblage into one book of scattered problems and theorems, the work of Apollonius, Archimedes, Euclid, Theodosius, etc., to which he has joined his own discoveries. The first two books are supposed (on insufficient grounds) to have treated of arithmetic and arithmetical problems, but only a small fragment of the second book is extant: the third book is a collection of problems, mostly of solid geometry: the fourth treats of curves other than the circle, according to the method of pure geometry: the fifth contains problems of maxima and minima: the sixth treats of the geometry of the sphere: the seventh—by far the most important to modern geometers, as it is almost the sole authority that we possess on the history and methods of the Greek geometrical analysis—treats principally of analysis; it contains also the proposition now known as 'Guldinus's Theorem,' which was plagiarized from P. by Father Guldin: the eighth and last book treats of machines. P. was author of several other works which are lost, excepting only a fragment of his *Commentary on Four Books of Ptolemy's Syntaxis*. P., as an independent investigator, has high reputation, and by Descartes is considered one of the most excellent geometers of antiquity. Some of his problems have had high interest for all succeeding geometers. The first complete editions of the *Collections* of P. were those of Commandine (Pesaro 1588) and Manolessius (Bologna 1660). The best ed. is that published Berlin 1876–78, by Friedrich Hultsch, *Pappi Alexandrini Collectionis quæ supersunt.*

PAPUA, *păp'ô-a* or *pâ'pô-â*, or NEW GUIN'EA: largest island, excepting Australia, on the globe; about 90 m. from Australia at its nearest point; lat. 0° 30′—10° 40′ s., long. 131°—150° 30′ e.; about 1,500 m. in length n.w. to s.e., with varying breadth of 200 to 400 m.; estimated area 250,000 sq. m. (The name Papúa means 'frizzly haired.') In outline the island is very irregular, the western part being nearly insulated by Geelvink Bay on the n. and M'Clure's Inlet from the w. The head of Geelvink Bay is separated from the s. coast by an isthmus only 35 m. in breadth. Eastward from this, the island increases to its greatest breadth, and terminates in the s.e., in a narrow peninsula of lofty mountains. E. of Torres Strait is a deep bay called the Great Bight of New Guinea, its e. shore being bold and rocky, with extensive coral reefs; its w. flat and marshy, covered with dense forests, and intersected with countless fresh-water canals. The Fly, largest river of the island, empties into it.

The island seems to have been sighted first 1526 and 28 by Portuguese navigators. In 1545 a Spanish captain sailed 250 m. along its n. coast, and gave it the name New Guinea, from its fancied resemblance to the Guinea coast of Africa. In 1606 a Spanish frigate under Capt. de Torres sailed along the s. shore to the strait that bears his name. In 1676 the Dutch captains Schouten and Le Maire landed on the island to obtain fresh water, and were attacked by the natives. De Bougainville, 1768, also made the s. coast of the island, and worked to windward along it. The English navigators, Cook 1770, Forrest 1774, Edwards 1791, and the following year Capt. Bligh, of *Bounty* notoriety, saw portions of the s. coast. Flinders, 1799, visited the island, and added a few facts to our scanty information. In the course of the voyage of the French ship *Astrolabe*, under the command of J. Dumont d'Urville, the distinguished naturalists Quoi and Gaymard studied the nat. history of the island, especially its zoology. A Dutch expedition 1828 added to the knowledge of the w. coast. In 1845 Captains Blackwood and Owen Stanley, of the British naval ships *Fly* and *Bramble*, surveyed part of the s. coast; and 1846–50 Owen Stanley surveyed the s. shores of the e. peninsula. In 1858 the Dutch govt. sent a surveying expedition in the steamer *Etna* to the n. and n.w. coasts. In 1869 attention was called to the lack of information on P., and to the fact that so little had been done to explore this great and fertile island, which lay almost within sight of Australia, and might be considered as belonging to that continent. Sir Charles Nicholson especially directed the attention of the Australian colonists to the importance of their becoming acquainted with the island, lying on the highway to India and China, and believed to be rich in minerals and commercial products. In 1871 a Russian steam-corvette left on the n.e. shores the naturalist Miklukho Maclay, who lived 15 months there, and has repeatedly visited P. since.

Meyer, and the Italian travellers Beccari and D'Albertis, have added much to our knowledge of the interior. The agents of the London Missionary Soc. also have extended our information concerning the country. Early in 1873, the Brit. naval ship *Basilisk*, Capt. Moresby, was sent to suppress the system of kidnapping natives in the neighborhood of Torres Strait; and this being accomplished, Capt. Moresby employed his time in continuing the survey of the e. coasts commenced by Capt. Owen Stanley. He found the e. part of the island different in form from the representations given on maps, inasmuch as a considerable portion of the e. promontory consisted of islands with deep channels between, instead of being a continuous line of coast. But little is known of the geography of the island beyond the coast. The n. side is hilly and densely covered with wood, while such portions of the s. coasts as have been visited are low and apparently swampy, but still densely wooded. A range of mountains, the Charles Louis Mts., commences on the s. coast near Geelvink Bay, and extends due e., rising gradually to nearly 17,000 ft., where it is lost sight of at a distance of 100 m. from the coast; but it is probable that this range continues through and subdivides the island until it joins the high land of the e. peninsula, where a succession of mountains, 14,000 to 5,000 ft. high, continues to the e. extreme. A large island, Frederick Henry Island, 100 m. long by about 50 broad, on the s.w. coast, was supposed a part of the mainland until a Dutch officer passed through the strait that separated it. The n. coast from East Cape to the boundary of the Dutch territory, nearly 1,000 m., was surveyed by Dr. Finsch in the steamer *Samoa* 1884. Numerous expeditions have been dispatched in recent years by the Australian colonies or by England, but perhaps the explorations of Chalmers and Forbes have contributed most to our knowledge of the island. Two Melbourne newspapers have taken an honorable part in the work, and a scientific expedition was dispatched by the Geographical Soc. of Australasia 1885. The whole of the s.e. coast to the e. extreme of the island, and on to the Louisiade Archipelago beyond, is fringed with dangerous coral reefs. China Strait, at the s.e. point of the main island, is, however, navigable for large ships. The tides, however, at springs, run at the rate of 5 or 6 knots an hour, but more careful and elaborate surveys will doubtless render navigation more safe and expeditious in these waters.

In an island of such vast extent as P., there may possibly exist several distinct races. With our little knowledge, two distinct races are admitted—viz., the Papuans, so called from the Malayan 'frizzled hair,' and the Haraforas. The Papuans are said to resemble the Australian aborigines, but, as a rule, are stouter. The Haraforas are distinguishable from the Papuans by lighter color and straighter hair; they also exhibit greater activity of body.

Except in the swampy districts, the climate is not unhealthful, though the temperature varies greatly, the thermometer sometimes indicating 95° F. by day and falling to 75° by night. On the s.w coast, the e. monsoon or rainy season begins about the middle of Apr., and ends in Sep.; the dry season is from Sep. to Apr.; and on the n. coast these two seasons are reversed.

The island is everywhere clothed with most luxuriant vegetation—cocoa-nut, betel, sago, banana, bread-fruit, orange, lemon, and other fruit-trees lining the shores; while in the interior are abundance of fine timber-trees, e.g., the ironwood, ebony, canary-wood, the wild nutmeg, and the massoi, the fragrant bark of which is a leading article of export from the s.w. coast. In the districts of the Arfak and Amberbakin Mts., the sugar-cane, tobacco, and rice are cultivated.

The nat. history of the w. part of P. has been recently examined by Alfred R. Wallace, who established the fact that a deep channel in the bed of the ocean, running w. of Celebes, and e. of the great islands of Java and Borneo, now known as Wallace's Line, separates two regions, in which the islands rise from shallow waters, and which are totally unlike each other in their botany and zoology. The islands on either side of this line he supposes to be the relics of submerged continents. Those on the w., or the Great Malay Islands, belong to the continent of Asia, and have its plants and animals. Those e. of the line, including P., have a flora and fauna resembling those of Australia. The latter island has a dry climate and stunted vegetation. P., on the contrary, has a warm and moist climate, pre-eminently fitted to produce a varied, luxuriant vegetation; and it is clothed from end to end with magnificent forests. Insect life is, as might be expected, abundant and varied; the Papuan species being remarkable for fine forms and beautiful colors. Still more interesting to the naturalist is the variety of birds, of which 120 species are singers, 30 parrots, and 28 pigeons. Those of land species which have been examined belong to 108 genera, 29 of which are found exclusively in Papua. The beautiful birds of paradise are peculiar to the island, and distinguish it from all other regions. In contrast to this variety of birds is the small number of mammals. The great pachyderms and quadrumana of the Malay Islands are wanting, and the mammals are 2 bats, 1 pig, 10 marsupials, 1 cetacea, and 1 carnivora. There is one true kangaroo similar to those of Australia. The climbing kangaroos take the place of the monkeys of the Asiatic area. It is believed that Wallace's Line, or one nearly coincident with it, separates two varieties of the human race, the Malays and the Papuans, or rather areas in which one of these races predominates.

Alfred R. Wallace, in his *Malay Archipelago*, says of the Papuans: 'There has been much difference of opinion about the races of the Oceanic region, but it is generally admitted that they belong to four different types

—those of (1) the Malays; (2) the Negritos or Papuans; (3) the Polynesians; (4) the Australians. The most distinguished of recent ethnologists class the Malays with the Mongols; the Negritos or Papuans, and the Polynesians, with the negroes of Africa; and distinguish widely the Australians from both. They do not recognize any fundamental distinction between the dark Papuans and the light-complexioned Polynesians. The w. parts of the island are inhabited by the former, the e. parts by the latter. The Papuans are well made, have regular features, intelligent black eyes, small white teeth, curly hair, thick lips, and large mouth; the nose is sharp, but flat beneath, the nostrils large, and the skin dark brown. They are,' Mr. Wallace says, 'superior in stature to average Europeans, but have long and thin legs, and the splayfoot of the negro.' He thinks the Papuans superior to the Malays in intelligence. In the w. parts, they are divided into small distinct tribes, frequently at war with each other. The men build the houses, hollow the trunks of trees into canoes, hunt, and fish; while the women do all the heaviest work, cultivating the fields, making mats, pots, and cutting wood. Their food consists of maize, sago, rice, fish, birds, the flesh of wild pigs, and fruits, etc. 'They are copper-colored, of a light, active build, often with very good features, which they paint; but the men's teeth and mouths are much disfigured by constant use of betel-nut. The hair is usually worn frizzled out into a huge mop. The women's hair is always cut short. Their weapons appear to be spears, swords, clubs, and stone hatchets but no bows and arrows were seen among them. Occasionally human jaw and spinal bones are worn as bracelets and ornaments. They appeared to take pleasure in making us understand that they had eaten the original owners of the bones; but these bones, as well as the few skulls exhibited in their villages, appeared to be of an ancient date. The houses are built after the Malay fashion, on poles raised 5 or 6 ft. above the ground, and consist of one large apartment.' The natives of Humboldt's Bay have a temple in every village, though nothing is known of their religion.

In the e. part of the island, the negro type of the inhabitants passes into that of the Polynesians. Capt. Moresby says of them that they have the light complexion and in all respects the appearance of the Polynesians, typically represented by the New Zealanders; that they are a friendly and intelligent people, and gladly received the English seamen at their villages, where they mixed freely with them. They practice several useful arts, such as pottery, and possess extensive, well-fenced plantations. In the n.e. part of the island, their villages are terraced and cultivated to a great height, in a manner which a Chinaman might envy. Capt. Moresby deems them a fine, promising race, and thinks that, with the aid of civilizing influences, a prosperous future awaits them.

The Dutch scientific expedition of 1858 appended to their report a vocabulary of the Myfore language, of about 1,200 words, collected by Ottow and Geisler, missionaries at Doreh, on the w. of Geelvink Bay. It is, however, known to differ greatly from languages spoken in other parts; and natives of the South Sea Islands have a facility in communicating with the Papuans on the Torres Strait. The London Missionary Soc. has therefore begun to Christianize them through Samoan teachers directed by British missionaries. The first chapel, on Murray Island, was opened 1875.

The population of P. and the immediately adjacent islands has been very variously estimated. Mr. Chalmers believes that it cannot be more than 2,500,000, The exports are massoi bark, trepang or bêche-de-mer, tortoise-shell, pearls, nutmegs, birds of paradise, crown-pigeons, ebony, resin, etc.

The inhabitants seem divided into a great number of petty tribes, independent of each other. No native government is known to extend over a great part of the island. The Dutch acquired the rights of their tributary, the sultan of Tidore; and it was partly to assert them that an expedition was undertaken 1828. At that time, the Dutch built a fort called Du Bus, in Triton Bay, 3°46′ s. lat.,and 134° e. long., and declared the whole island w. of a line from Cape Bonpland in the n., along 141° e. long., to Torres Strait, to belong to the Netherlands; but the settlement was abandoned. In 1858 the Dutch made another attempt to establish a colony. The *Etna* was fitted out for that purpose. The expedition visited a great part of the n.w. coast. Recent attempts of parties of miners to tap the metallic treasures of P. have not yet met success.

That a great future is open to this vast territory is undoubted. Rich in natural products and mineral wealth to an extent of which we can have no conception, situated in such close contiguity to one of the largest British possessions, and between it and China, Japan, and India, it is of immediate consequence to England; the w. part may be regarded as under the Dutch power. In 1883 the govt. of Queensland annexed the eastern portion of P., but its action was not sanctioned by the imperial govt., and it was not till the close of 1884 that the area of this protectorate was defined. Immediately afterward, the Australian colonies were startled by the news that the German flag had been hoisted at several places along the n.e. coast and on many of the adjacent islands. The boundaries since agreed upon give an area on the German side of about 67,000 sq. m.; on the English, of 63,000 sq. m.; and nearly approach the water parting-line or natural boundary.

See *The Malay Archipelago*, by A. R. Wallace; *New Guinea*, by D'Albertis (1880); *Proceedings of Geographical Society; Work and Adventure in New Guinea*, by Chalmers and Gill (1885); Parliamentary Papers, 1883 and other years; *Australian Handbook* for 1886.

PAPUAN SUBREGION: a faunistic subdivision of the Australian Region which embraces the mountainous, heavily forested islands of the Papuan archipelago, north of Australia.

PAPULA, n. *păp'ū-lă*, PAP'ULÆ, n. plu. *-lē* [L. *pap'-ula*, a pimple]: a pimple. *Papulæ* constitute one of the orders in the classification of cutaneous diseases. They occur as little elevations of the cuticle, of red color, containing neither pus nor any other fluid, and ending usually in a scurf. PAPULAR, a. *-lăr*, pertaining to pimples; characterized by pimples. The diseases regarded as papular are Strophulus, Lichen, and Prurigo; but there are other diseases in which the first external symptom is a papular eruption, e.g., small-pox in which the papula speedily develops into a pustule. PAP'ULOUS, a. *-lŭs*, or PAP'ULOSE, *-lōs*, covered with papulæ; pimply.

PAPYRI, *pa-pī'rī:* MSS. rolls of the paper of the papyrus plant; corresponding to the Greek *biblia*. These rolls are of very remote antiquity, some of the still remaining Egyptian papyri being certainly as old as the 6th dynasty, and others as old as the 12th, or from about B.C. 2000. This long continuance is due to their mode of preservation, and to the peculiarly dry climate of Egypt. Papyrus rolls have been found deposited in different ways, those of religious character being placed on the bodies of the mummies, at the feet, arms, or in the hands, sometimes, indeed, packed or laid between the bandages, or even spread over the whole bandage, like a shroud. At the time of the 19th and 20th dynasties (B.C. 1320-1200), they were deposited often in hollow wooden figures of the god Ptah Socharis Osiris, or of the god Osiris, placed near the mummies. Papyri of civic character were deposited in jars or boxes, placed near the mummies; and they have been found in the remains of ancient libraries.

The following are the principal kinds of Egyptian papyri.—I. *Hieroglyphical Papyri*, always accompanied by pictures or vignettes, and consisting of three classes: 1. Solar litanies or texts, and pictures relating to and describing the sun's passage through the hours of the night, when that luminary was supposed to enter the Egyptian Hades or hell. 2. Books of the empyreal gate, or heaven, with vignettes of deities, and other representations referring to the genesis of the cosmos or universe. 3. The so-called Ritual, consisting of a series of sacred or hermetic books, some of very remote antiquity, accompanied with rubrical titles and directions as to their efficacy and employment, and comprising various formulas ordered to be placed on the coffins, amulets, and other furniture of the dead, for better preservation of the souls of the dead and of the mummies in the future state. In this book are found also chapters giving an account of the future judgment, of the *makhenu*, or boat of the dead, of the Elysian Fields, and of the Halls through which the dead had to pass. The work was considered mystic, and parts were supposed to be writ-

ten by the god Thoth himself. A copy more or less complete, according to the wealth of the deceased, was deposited with all the principal mummies; and from the blank spaces left for the name, which were afterward filled, it is evident that they were kept ready-made.—II. *Hieratic P.*, written in the hieratic or cursive Egyptian hand, comprising a more extensive literature than the hieroglyphic papyri. This handwriting being used for civil as well as religious purposes, the papyri found in it differ considerably from one another, and comprise rituals of the class already mentioned, principally in use about the 26th dynasty, or B.C. 6th c., but found also on some few papyri of a remote period; a book called *Lamentations of Isis;* magical P., containing directions for preparation of charms and amulets, and adjuration of deities for their protection; civic documents, consisting of the examination of persons charged with criminal offenses, the most remarkable of which are that of an offender charged with the practice of magic in the 19th dynasty, another of a criminal charged with various crimes in the reign of Sethos I., the examination of a conspiracy in the palace of Rameses II., and the *procès-verbal* of an offender charged with violating the sepulchres of the kings in the reign of Rameses IX. Besides these, there are several letters of various scribes on subjects connected with the administration of the country and private affairs; laudatory poems of Egyptian monarchs, one describing the campaign of Rameses II. against the Khita or Hittites; historical documents, the journeys in foreign parts; the endowment of temples by Rameses III.; works of fiction—one of the adventures of two brothers, the death of the younger, owing to the false accusation of the wife of the elder, his revival, and transformation into a bull and a Persea-tree; another, the story of a doomed prince, and the adventures of different persons. Works on plants and medical subjects, books of proverbs, lists of kings, historical accounts, are among these documents.—III. The last class of Egyptian P., those written in the *Demotic* or enchorial character, consist of rituals, contracts for the sale of mummies and lands, accounts and letters, and miscellaneous documents. These P. are often bilingual, sometimes accompanied with hieratic or Greek versions. Many of these P. have been translated by De Rougé, Chabas, Heath, Goodwin, Birch, and others. Many Greek P. have been found belonging to the archives of the Serapeion, referring to the administration of that temple, the orations of Hyperides, and some of the books of Homer. At all times in the history of Egypt, libraries of P. seem to have existed, and, under the Ptolemies, are said to have contained as many as 700,000 rolls.

Another class of ancient P., those of Pompeii and Herculaneum, are of considerable interest, as showing the condition and arrangement of a Roman library. The P. of Herculaneum are $8\frac{1}{2}$ to $12\frac{3}{4}$ inches wide, and are rolled in a cylindrical roll, *volumen*, on a stick or

inner roll, *bacillus*, *umbilicus*, having a stud at the end, *cornu*. They had their titles written on a strip, *lorum*, in red letters, and the writing was either on blind lines or on lines ruled with lead. About 1,800 P. were discovered at Herculaneum, 1753, in the library of a small house, charred to a cinder, and some of these, by the greatest skill and care, have been unrolled by a very laborious process at Naples. Unfortunately, they have not answered the literary expectations formed of them; they consisted of the works of philosophers of the Epicurean school, which the proprietor of the library seems to have collected. Some of the P. were in Latin, and more difficult to unroll. Many have been published. They are written on only one side. When a small number were required, they were placed in a cylindrical bronze chest (*cista*), packed tightly in a perpendicular position, and were taken out single, and read by unrolling from one end. These P. were of various prices; old ones, like old books, being of immense value; but those containing the works of contemporary authors were not dearer, perhaps, than modern books. Many extensive private and public libraries existed in Greece and Rome, but all have perished except those exhumed from Herculaneum.

Wilkinson, *Man. and Cust.* iii. 62, 147, 188, v. 482; Winckelmann, ii. Bd. i. 1; Chabas, *Pap. d'Harris* (Chalon 1860); *Papyrus Hieratiques* (8vo, Chalon 1863); *Voyage d'un Egyptien* (1866); Pleyte, *Papyrus de Turin* (1869–74); *Cambridge Essays* (1858), 227; De Rougé, *Rev. Contemp.* xxvii. 389; Devena, *Papyrus Judicione de Turin* (1868); *Trans. Soc. Bibl. Arch.* (1874).

PAPYROGRAPHY, n. *păp'ĭ-rŏg'ră-fĭ* [Gr. *pap'ūros*, the paper-reed, the papyrus; *graphō*, I write]: a method of reduplication and indefinite multiplication of copies of a writing by a mechanical ink process. PAPYROGRAPH, n. *pă-pī'rō-grăf*, the machine or press employed.

PAPYRUS, n. *pă-pī'rŭs*, PAPY'RI, n. plu. *-rī* [L. *papy'rus*; Gr. *pap'ūros*]: kind of reed very abundant in the valley of the Nile, of which the ancients made the paper or material on which they wrote; the *Cy'perus papy'rus*, ord. *Cyperāceæ* (see PAPYRUS, below). PAPY'RI, certain MSS. made of the papyrus, found in various places, especially in Egypt (see PAPYRI, above). PAPYRACEOUS, a. *păp'ĭ-rā'shŭs*, pertaining to the papyrus. PAP'YRIN, n. *-ĭ-rĭn*, a tough and durable substance closely resembling parchment, made from paper by dipping it into sulphuric acid, washing with water, immersing in dilute ammonia, rewashing, and then drying; also called *paper* or *vegetable parchment*.

PAPYRUS, *pa-pī′rŭs:* genus of plants of nat. order *Cyperaceæ*, of which there are several species, the most important being the EGYPTIAN P., or *Papyrus* of the ancients (*P. antiquorum*, *Cyperus papyrus* of Linnæus); a kind of sedge, 8 to 10 ft. high; with a very strong, woody, aromatic, creeping root; long, sharp-keeled leaves; and naked, leafless, triangular, soft, and cellular stems, as thick as a man's arm at the lower part, and at their upper extremity bearing a compound umbel of extremely numerous drooping spikelets, with a general involucre of 8 long filiform leaves, each spikelet containing 6–13 florets. By the anc. Egyptians it was called *papu*, from which the Greek *papyrus* is derived, though they called it also *byblos* or *deltos*. The Hebrews called it *gomé*, a word resembling the Coptic *gom*, or volume; its modern Arabic name is *Berdi*. So rare is the plant in the present day in Egypt, that it is supposed to have been introduced either from Syria or Abyssinia; but it has been seen till lately in the vicinity of the Lake Menzaleh, and specimens have been sent to England; and as it formerly was considered the emblem of northern Egypt, or the Delta, and grown only there, it must, if introduced, have come from some country n.

Papyrus (*P. antiquorum*).

of Egypt. It has been found in modern times in the neighborhood of Jaffa, on the banks of the Anapus, in the pools of the Liane, near Syracuse, and in the vicinity of the Lake Thrasymenus. It is represented on the oldest Egyptian monuments, and as reaching the height of about ten ft. It was grown in pools of still water, growing ten ft. above the water, and two ft. beneath it,

and restricted to the districts of Sais and Sebennytus. The P. was used for many purposes both ornamental and useful; such as crowns for the head, sandals, boxes, boats, and cordage, but principally for a kind of paper called by its name. Its pith was boiled and eaten, and its root dried for fuel. The papyrus (see PAPYRI) or paper of the Egyptians was of the greatest reputation in antiquity, and it appears on the earliest monuments in the shape of long rectangular sheets rolled up at one end, and on which the scribe wrote with a reed called *kash*, with red or black ink made of an animal carbon (see PAPER). When newly prepared, it was white or brownish white, and lissom; but in the process of time, those papyri which have reached the present day have become of a light or dark brown color, and exceedingly brittle, breaking to the touch. Though P. was commonly used in Egypt for MSS., and was the paper of the period, and was mentioned by early Greek authors, it does not appear to have come into general use among the Greeks till after the time of Alexander the Great, when it was extensively exported from the Egyptian ports under the Ptolemies. Fragments, indeed, have been found to have been used by the Greeks centuries before. It was, however, always an expensive article to the Greeks, and a sheet cost more than the value of a dollar. Among the Romans, it does not appear to have been in use at an early period, though the Sibylline books are said to have been written on it, and the plant was cultivated in Calabria, Apulia, and the marshes of the Tiber. But the staple was no doubt imported from Alexandria, and improved or adapted by the Roman manufacturers. So extensive was the Alexandrian manufactory, that Hadrian, in his visit to that city, was struck by its extent; and later in the empire, an Egyptian usurper (Firmus, A.D. 272) is said to have boasted that he could support an army from his materials. It continued to be employed in the Eastern and Western Empires till the 12th c., and was used among the Arabs in the 8th c.; but after that period, it was quite superseded by parchment. At later periods, it was no longer employed in the shape of rolls, but was cut into square pages, and bound like modern books.

As a matter of scientific interest, experiments on the manufacture of paper from the P. have been made in recent times by Landolina, Seyffarth, and others.—Another species of P. (*P. corymbosus* or *P. Pangorei*) is much used in India for mats: see INDIAN GRASS MATTING.

PAR, n. *pär* [L. *par*, equal: It. *pare:* F. *pair*]: equal value; the state of the shares of a public undertaking when they are neither at a discount nor a premium—that is, when they may be purchased at the original price, usually called AT PAR. BELOW PAR, at a discount. ABOVE PAR, at a premium. ON A PAR, on a level; in the same condition or rank. PAR OF EXCHANGE, the established value of the coin or standard value of one country expressed in the coin or standard of another.

PAR (Fish): see PARR.

PARA, *păr'ă* [Gr. *para*, by, along]: a prefix, usually contr. PAR, signifying: side by side, as for comparison: alongside; near to; like; unlike; beyond; divergence or contrariety.

PARA, n. *pā'rā:* small coin of copper, silver, or mixed metal, though usually of copper, current in Turkey and Egypt; it is the 40th part of a piaster, is divided into 3 aspers, and varies much in value, owing to the debased and complicated condition of Turkish coinage. Pieces of 5 paras also are in use. The para is equal to about $\frac{1}{18}$ of a penny sterling in Turkey, and $\frac{1}{16}$ of a penny sterling in Egypt. See PIASTER.

PARA, *pâ-râ':* name of a water-course, the s. arm of the Amazon, forming an outlet for that river into the Atlantic, on the s. side of the island of Marajo (q.v.). It is 200 m. long, 20 m. broad opposite the city of Para, and 40 m. broad at its mouth. Its most important affluent, and the source whence it draws, perhaps, the great mass of its volume of waters, is the Tocantins. Formerly, the name P., said to signify 'father of waters,' was applied in a general way to the river Amazon. At the spring-tides, the *bore* rushes up the river with enormous force, forming a wave 15 ft. high.

PARA': important province of Brazil, in the extreme n. of the country; bounded n. by Guiana and the Atlantic, e. by Maranham and Goyaz, s. by Matto Grosso, w. by Amazonas; 460,000 sq. m. It is one of the largest provinces of Brazil—having an area nearly twice the extent of Austria; is watered by the Amazon and its great affluents the Tapajos, Xingu, and Tocantins; and forms a portion of a dist.—the Amazon valley—which has been described by the most thorough explorer of this region as unequalled for richness of vegetable production and fertility of soil. The surface of the country is level, and consists of great plains, intersected by rivers, and covered with primeval forests, and in some cases with rich pasture. The climate, though warm, is not unhealthful. The precious metals, with diamonds, iron, and coal, are found, but are not worked. The timber is valuable, and the chief crops raised on the very limited area as yet brought under cultivation are coffee, rice, millet, and cotton. Pop. (1890) 328,455.

PARA', or BELEM, *bā-lĕng':* thriving city and seaport of Brazil, cap. of the province of P.; on the e. bank of the river P., 80 m. from its mouth; lat. 1° 28′ s., long. 48° 28′ w. The harbor is formed by an abrupt curve or inlet of the channel of the river, here 20 m. broad. Vessels of large size are admitted; but the anchorage, though safe, has of late years become increasingly difficult of access, owing to the silting up of the approaches. The streets are paved and macadamized, but are mostly out of repair; the houses, like those of most Brazilian towns, have whitened walls and red-tiled roofs. Among the principal buildings are the palace, the cathedral, and

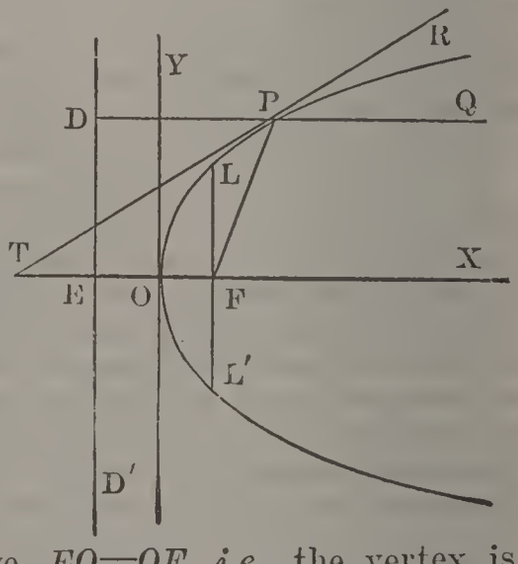
the churches. There are also numerous public squares, a college, and a beautiful botanic garden. The city is supplied with water by water-carts that perambulate the streets. The Amazon Navigation Company, a Brazilian association, has erected large workshops, coal depots, and wharves; the steam navigation is rapidly extending. The imports have an annual value of about 5,000,000 dollars; the annual exports reach nearly 8,000,000 dollars, of which about 6,000,000 are for India-rubber. The imports are principally cotton manufactures, wheat and flour, cutlery and hardware, wool, gold and silver wares, coins, and wine. The exports are India rubber, coffee, sugar, raw cotton, hides, tobacco, diamonds, and cocoa. P. is the mart through which passes the whole commerce of the Amazon and its affluents. The city was the seat of revolution during 1835, when a great number of lives were lost and houses destroyed, and grass grew in streets that previously had been the centre of business. It is only since 1848 that P. can be said to have fairly entered on a path of orderly commercial progress; and its advance has since been continuous and rapid. Pop. (1890) 65,000.

PARABLE, n. *păr'ă-bl* [OF. *parabole*, a parable—from L. *parab'ola;* Gr. *parab'olē*, a comparison—from Gr. *para*, side by side; *ballō*, I throw]: short narrative or fictitious tale conveying some important truth or lesson; a similitude; in *Scrip.*, also, something obscurely expressed. SPEAKING IN PARABLES, speaking in similitudes; using illustrations drawn from natural objects as vehicles of instruction (see below).—SYN. of 'parable': apologue; fable; allegory; fiction; novel; romance.

PAR'ABLE: originally, the name given by the Greek rhetoricians to an illustration avowedly introduced as such; in later Hellenistic and New Test. Greek, it came to signify an independent fictitious narrative, employed for illustration of a moral rule or principle. This kind of illustration is of Eastern origin; and admirable examples are found in the Old and New Testaments, particularly in the discourses of Christ. Much of Christ's parabolic imagery is found in the writings of Hillel, Shammai, and other great rabbis, e.g., the parables of the Pearl of Great Price, the Laborers, the Lost Piece of Money, the Wise and Foolish Virgins, etc. Among modern writers, the German divine Krummacher (q.v.) has distinguished himself in this species of composition. The P. differs from the Fable (q.v.) in the probability or verisimilitude of the story itself, and agrees with it in the essential requisites of simplicity and brevity. In the course of time, the word parable came to lose its significance of figurative speech, and to mean speech generally. From the *parabola* of the Latin Vulgate came the mediæval Latin *parabolare*, whence the modern French *parler* and *parole*. The best English work on the parables of the New Test. is by Abp. Trench.

PARABOLA, n. *pă-răb'ō-lă* [Gr. *parab'olē;* L. *parab'olē*, a comparison (see PARABLE)]: one of the conic sections or curves formed from cutting a cone by a plane parallel to one of its sides (see below). PAR'ABOL'IC, a. *-bŏl'ĭk*, or PAR'ABOL'ICAL, a. *-ĭ-kăl*, expressed by parable; having the form of a parabola, or pertaining to it. PAR'ABOL'ICALLY, ad. *-lĭ*. PARABOLE, n. *pă-răb'ō-lē*, a comparison; a similitude. PAR'ABOL'IFORM, a. *-ĭ-fawrm* [Gr. *para*, side by side; *ballō*, I throw; *forma*, shape]: resembling or having the shape of a parabola. PARABOLOID, n. *pă-răb'ō-loyd* [Gr. *parab'olē*, a comparison; *eidos*, resemblance]: solid figure traced out by a Parabola (q.v.) revolving round its principal axis; called also the *parabolic conoid*. Sections of this solid parallel to the principal axis are parabolas, and those perpendicular to its circles. The term 'paraboloidal,' for which 'parabolic' is frequently but improperly substituted, is applied either to bodies having the form of a paraboloid, or to concave surfaces which seem to have taken their peculiar hollow shape from the impress of a paraboloidal body.

PARABOLA: a section of a circular cone made by a plane which is parallel to an element of the conical surface; or, it is a conic whose eccentricity is unity. Kinematically it may be defined as the locus of a point P which moves so that its distance from a fixed point F, called the *focus*, is always equal to its distance from a fixed straight line $D'D$, called the *directrix*, *i.e.*, $DP=FP$. The ratio $FP:DP=1$, which is the eccentricity of the conic. The line EF passing through the focus and perpendicular to the directrix is called the *axis*, or *principal diameter*. The curve is also symmetrical with respect to this line. The point O where the axis meets the curve is called the *vertex* of the parabola. Since O is a point on the curve, $EO=OF$, *i.e.*, the vertex is midway between the focus and the directrix.



If the axis and the tangent at the vertex are taken as axes of coordinates the equation of the parabola is easily found as follows: $FP^2=DP^2$, *i.e.*, $y^2+(x-a)^2=(x+a)^2$. Whence $y^2=4ax$, which is the required equation, where $a=EO=OF$. When $x=a$, $y=\pm 2a$. Hence $L'L=4a$. This line $L'L$ is called the *latus rectum*. If F is taken as the pole and FX as initial line, the polar equation of the parabola is $r=\frac{l}{1-\cos\theta}$, where $l=2a=$ half the latus rectum.

The parabola is a curve of rather frequent occurrence in nature. The path of a projectile, as, for example, a cannon ball, if it were not for the resistance of the atmosphere, would be accurately a parabola whose axis is vertical and whose vertex is the highest point of its path. Similarly, a stream of water issuing from the nozzle of a hose takes approximately the form of a parabola. The cable of a suspension bridge, if the load is uniformly distributed along the horizontal, will also take the form of a parabola.

If in the figure the line DP is produced to Q, then the $LFPT = LRPQ$, where RPT is a tangent line. The efficiency of the reflectors used in search-lights, head-lights on locomotives and street cars, etc., depends upon this property of the parabola. In these lights the reflecting surface is made in the form of a paraboloid, *i.e.*, a surface generated by revolving a parabola about its axis. The light is placed at the focus and all the rays that strike the surface are reflected in a direction parallel to the axis of the generating parabola. Conversely, if parallel rays of heat (or light), as for instance the rays of the sun, fall upon a parabolic mirror, they will all be reflected to the focus. In this way a very high temperature can be produced.

The parabola has no asymptotes, although, as is easily seen from the equation, the curve extends to an infinite distance on both sides of its axis.

The term parabola is also used in a general sense to denote any curve whose equation can be written in the form $y^m = AX^n$, where m and n are both positive integers. If $m=2$ and $n=1$, the curve is the common parabola. If $m=1$ and $n=2$, the curve is called a *cubical* parabola; if $m=2$ and $n=3$, a *semi-cubical* parabola.

PARABOLANI, *pa-răb-ō-lâ'nī* [Gr. *parabolos*, a desperate person]: class of functionaries in the early church, by some writers reckoned as members of the clergy, and included in the ranks of the minor orders, but more probably religious associations whose duty it was to assist the clergy, especially in the more laborious and menial offices of religion or of charity. The etymology of the name is somewhat curious, being derived or applied from that of those desperate adventurers of the arena who hired themselves for the wild-beast fights of the amphitheatre. The chief duty of the Parabolani was the tending of the sick, whether in ordinary diseases or in times of pestilence. By some the association is believed to have originated at Alexandria, and perhaps to have been peculiar to that church; but though the Parabolani were certainly very numerous at Alexandria, amounting to 500 or 600, it is beyond all question that they were enrolled also in other churches. They held the same place in ministrations to the living that the *Fossores* of Rome or the *Kopiatai* of the Greeks did in the burial of the dead. As the Parabolani were bold and indifferent to death, laws were enacted to prevent them from exciting seditions which were particularly common

at Alexandria. Their number was limited by Theodosius, and they were forbidden to attend at public assemblies and courts of justice, unless they had some business there sanctioned by the law. More than once they showed themselves deserving of suspicion, as for example at the Council of Ephesus in 449, when a Syrian monk named Barsumas, at the head of a band of armed Parabolani, committed outrageous excesses and terrified the council into granting his demands. At first they were subject to the Præfectus Augustalis, but a later decree placed them directly under the authority of the bishop.—The name Parabolani must not be confounded with the epithet *parabolarius*, which the pagans applied to the Christian martyrs, from the recklessness with which they gave their lives for their faith.

PARAB'OLOID: in geometry, a solid figure traced out by a parabola revolving round its principal axis. It is a characteristic property of paraboloids that they have no centres except in the extreme cases, when they have an infinite number of centres. There are three varieties of paraboloids, elliptical, hyperbolic and parabolic.

PARACATU, *pâ-râ-kâ-tô':* Brazil, town in the eastern part of the state of Minas Geraes, 450 miles northwest of Rio Janeiro, on the river of the same name, which is an affluent of the São Francisco. The city dates from the middle of the 18th century, in which it was the centre of a rich auriferous district. The gold-washings are no longer of value; cattle, hides, sugarcane and coffee are its important products. Pop. about 15,000.

PARACELSUS, *păr-a-sĕl'sŭs* (real name THEOPHRASTUS BOMBAST VON HOHENHEIM): empirical medical practitioner and theorizer: about 1493-1541, Sep. 24; b. in the small town of Marien-Einsiedeln, near Zurich, in Switzerland; son of Wilhelm Bombast von Hohenheim, physician and chemist, and of the lady-superintendent of the hospital attached to the convent of Einsiedeln. The name Paracelsus is a rude rendering into Greek and Latin of his patronymic. It seems doubtful if he ever attended any regular school, but he received from his father the rudiments of Latin, and whatever else he could teach. Paracelsus soon took to roaming, and even pursued his travels into Asia and Africa. How he maintained himself during his pilgrimage is unknown; probably by necromancy and quack cures—*i.e.*, proclaiming that he had certain specifics, and bargaining for the amount that he was to receive if he performed a cure. He was a diligent chemist in a practical way, investigating the processes of preparation of metals, and making experiments as to their medicinal virtues; also to discover the philosopher's stone. As a chemist, he was a worker at the mines in Tyrol for Sigismund Fugger, of the wealthy family famed for its patronage of art and science. His cures, real or pretended, became noised abroad, and he was called to prescribe for all the great men of his day. At the age of 33 he boasted of having

cured 13 princes, whose cases had been declared hopeless. He was then at his zenith, and at the recommendation of Ecolampadius was appointed prof. of physic and surgery at Basel. He commenced his academic career by publicly burning Galen's works, exclaiming that Galen did not know as much as *his* shoe-latchets. 'Reading never made a physician,' he said; 'countries are the leaves of nature's code of laws—patients his only books.' His class-room, at first full to overflowing, was soon deserted, and (as was reported) he fell into habits of excessive intemperance; indeed, his sec. asserts he was drunk every day; never undressed, and went to bed with his famous sword by his side, which he would draw, and flourish about the room. His departure from Basel was caused by a dispute with a canon, one of his patients, a public dignitary with whom the town-officials sided. P. denounced them so fiercely that it became necessary for him to escape from the place. He then recommenced his wanderings. Wherever he went, he excited the regular faculty to violent hatred, by his denunciation of their ignorance, and of the greed and dishonesty of the regular apothecaries. Abp. Ernst invited P. to settle at Salzburg; where, after a few months, he died—some authorities say, from a drunken debauch of several days; others, from fracture of his skull by being thrown down a steep descent by some friends of the physicians and apothecaries whom he had accused. Trustworthy evidence in the case is lacking. That a man whose life was such an incoherent medley should exert an influence for centuries after his death causes surprise; but he and the age were fitted for each other. Moreover, he struck the weak point of the prevailing system of medicine; he appealed to the public as to whether it were not a false system that could only lead to failure; and he proposed a system of his own, which, though shrouded in absurdity and obscurity, served at least to inaugurate a new era of medicine. The prominent idea of his system is, that disease does not depend on an excess or deficiency of bile, phlegm, or blood, but that it is an actual existence, a blight on the body, subject to its own laws, and to be opposed by some specific medicine. See the works of P.; also of Schulz (1831); Lessing (1839); Mook (1876); Russell (1861); also Browning's famous poem on Paracelsus.

PARACENTESIS, n. *păr'ă-sĕn-tē'sĭs* [Gr. *para*, side by side; *kentēsis*, a goading—from *kentĕō*, I pierce]: in *surg.*, art or operation of perforating a part of the body to allow the escape of a fluid.

PARACENTRIC, a. *păr'ă-sĕn'trĭk*, or PAR'ACEN'TRICAL, a. *-trĭ-kăl* [Gr. *para*, away from; *kentron*, centre]. going out of the strict curve that would form a circle.

PARACHRONISM, n. *pă-răk'rō-nĭzm* [Gr. *para*, beyond; *chronos*, time]: error in dating an event later than the time of its taking place.

PARACHUTE, n. *păr′ă-shōt′* [F. *parachute*—from *parer*, to ward off; *chute*, a fall]: apparatus resembling a gigantic umbrella; invented for the purpose of retarding the velocity of descent of a body through the air, and employed by aeronauts as a means of descending from balloons. It is strongly made, and having the outer extremities of the rods, on which the canvas is stretched, firmly connected by ropes or stays to the lower part of the handle. The handle of the P. is a hollow iron tube, through which passes a rope connecting the balloon above with the car (in which are the aeronauts and their apparatus) beneath, but so fastened that, when the balloon is cut loose, the car and P. still remain connected. When the balloon ascends, the P. collapses like an umbrella; but when the balloon rope is severed, and the car begins to descend, the P. is extended by the action of the air, and prevents the car from acquiring a dangerous velocity of descent; the final velocity in those cases where the machine is of a size proportioned to the weight it has to support being no more than would be acquired by a person leaping from a height of between two and three ft. But the slightest derangement of the parachute's equilibrium, such as might be caused by a breath of wind, or the smallest deviation from perfect symmetry in the parachute itself, immediately produces an oscillatory motion of the car, having the apex of the P. as a centre; and the oscillations becoming gradually greater and more rapid, the occupants of the car are in most cases either pitched out, or are along with it dashed on the ground with frightful force. In various ways the attempt has been made to remedy this defect in the P.; but hitherto with little result. The first successful experiment with the P. was made by Blanchard at Strasburg 1787, and the experiment has been often repeated by Garnerin and others; very frequently, however, with fatal results.—The P. was employed by Capt. Boxer, of the British navy, as an essential part of his patent light-ball, for discovering the movements of an enemy at night, and was so arranged as to open when the lighted ball had attained its greatest elevation, so as to keep it for a considerable period almost suspended in the air.

PARACLETE, n. *păr′ă-klēt* [Gr. *paraklētos*, an advocate, a counselor—from *para*, side by side, near to: *kalĕō*, I call]: a term applied to the Holy Spirit; a counselor and advocate; a comforter or strengthener.

PARACLOSE, n. *păr′ă-klōs*, or PARCLOSE, n. *pâr′klōs* [OF. *paraclose*, an inclosed place: L. *per*, through; *clausum*, to shut]: a screen separating a chapel from the body of the church.

PARACYANOGEN, n. *păr′ă-sī-ăn′ō-jĕn* [Gr. *para*, beside, close to, and *cyanogen*]: a solid modification of cyanogen gas.

PARADE, n. *pă-rād′* [F. *parade*, a place where troops assemble—from Sp. *parada*, one of the figures in the carrousel, a halt—from Sp. *parar*, to stop, to halt—from L. *parātus*, placed in order: It. *parata*, any preparation]: order or array of troops; the place where troops assemble for exercise, etc.; show; ostentatious display. The word in its original sense signified a prepared ground, and was applied to the courtyard of a castle, or to any inclosed and level plain. From the practice of reviewing troops at such a spot, the review itself acquired the name parade. In its modern military acceptation, a *parade* is the turning out of the garrison, or of a regiment in full equipment, for inspection or evolutions before some superior officer. PARADE, v. to cause to assemble for inspection or exercise; to assemble in military order; to walk about as for show. PARA′DING, imp. making an ostentatious show: N. an ostentatious show. PARA′DED, pp.—SYN. of 'parade, n.': ostentation; display; exhibition; spectacle.

PARADIGM, n. *păr′ă-dĭm* [F. *paradigme*—from Gr. *paradeig′ma*, a model—from *para*, side by side; *deiknu′mi*, I show or point out]: an example or model of the declension of a substantive or the conjugation of a verb; a pattern or model. PAR′ADIGMAT′IC, n. *-dĭg-măt′ĭk*, one who cites the lives of religious persons as examples for imitation. PAR′ADIGMAT′ICAL, a. *-ĭ-kăl*, consisting of or resembling a paradigm; exemplary.

PARADISE, n. *păr′ă-dīs* [Gr. *paradeis′os*, derived from the Persian, and denoting a large inclosed park for the preservation of game: Heb. *pardes*, a park, a place planted with trees: F. *paradis*, a paradise—from mid. L. *paradīsus*, a pleasure-ground]: the Garden of Eden (see EDEN): any region or state of supreme felicity; heaven; *familiarly*, a fruitful, pleasant, and healthful valley or garden. PARADISIACAL, a. *păr′ă-dĭ-sī′ă-kăl*, pertaining to or resembling Paradise. BIRD OF PARADISE (see that title).

PARADOS, n. *păr′ă-dŏs* [F. *parer*, to defend; F. *dos;* L. *dorsum*, the back]: in *milit.*, another name for Traverse—a parapet or intercepting mound, erected in various parts of a fortification for the purpose of protecting the defenders from a rear or a ricochet fire: see FORTIFICATION.

PARADOX, n. *păr′ă-dŏks* [F. *paradoxe*—from Gr. *paradox′os*, contrary to opinion, strange—from Gr. *para*, contrary to; *doxa*, an opinion or notion]: that which is contrary to the received belief. Cicero, in his book on paradoxes, states that the Stoics called by this name all those unusual opinions which contradict the notions of the vulgar. A paradox is not necessarily an opinion contrary to truth. There have been bold and happy paradoxes, utterances of genius—seeming absurdities at the time, but afterward proved true in fact—whose fortune it has been to overthrow accredited errors, and in the course of time to become universally accepted as

truths; but this, the highest form of P., only another name for originality of thought, or for novelty of scientific discovery, is rare. The P. which springs from a vain desire to surprise, or from a passion for distinction, and which, in its efforts, oversteps or overstrains facts, or despises good sense, or needlessly denies experience, is far more frequent. It may not be at bottom a positive error in thought; but it is so exaggerated in expression, that, if taken literally, it actually does mislead. This is the besetting sin of the brilliant and epigrammatic class of writers, abundant examples of which are found in modern French literature. PAR′ADOX′ICAL, a. *-ĭ-kăl*, having the nature of a paradox; contrary to received opinions or notions. PAR′ADOX′ICALLY, ad. *-lĭ*. PAR′ADOX′ICALNESS, n. *-nĕs*, state of being paradoxical.

PARADOXURUS, *păr-a-dŏks-ūr′ŭs* [Gr. *paradoxon*, Paradox (q.v.); *oura*, tail]: genus of *Viverridæ*, or Civet family, confined to the e. hemisphere, like all the other extant genera of the same family; but remains of a genus of Viverrids, or at least of a viverroid genus, *Viverravus*, exist in the Eocene of America. The generic name has its reason in the ability of P. to curl its long tail downward into a coil. Ten species are known; in all, the feet are plantigrade, claws half-retractile, and there is no anal pouch. The Common Paradoxure, or Palm-cat (*P. typus*), is a native of India; has a blackish body, with obscure longitudinal bands on the flanks, a black tail, and a white spot below the eye.

PAR′AFFIN, or PAR′AFFINE, n. *păr′ăf-fĭn* [L. *parum affinis*, having little affinity]: term denoting hydrocarbon compounds having the general formula $C_n H_{2n+2}$. Of these compounds, some are gaseous, others liquid. The substance commonly known as P., or solid P., is, when pure, a colorless, translucent, fatty body, without taste or smell, having a density of about ·87; it melts at 45° to 65°, boils at 370°, and crystallizes from alcohol in snow-white needles. It is acted on with great difficulty by other substances—hence its name. P. is found native in the coal-measures and other bituminous strata, constituting the minerals known as *fossil wax*, *ozocerite*, etc. It exists also in the state of solution in many kinds of Petroleum (q.v.), and may be separated by distilling off the more volatile portions, and exposing the remainder to a low temperature. By a like process, it is obtained from the tar of wood, coal, and bituminous shale. It is largely used as a substitute for sulphur in manufacturing matches. Those varieties of P. which melt at temperatures above 113° are well adapted for making candles.—See NAPHTHA; SHALE; PARAFFIN OIL.

PARAFFIN OIL.

PAR'AFFIN OIL: oil obtained from distillation of cannel coals and bituminous shales; a name often applied to kerosene oil in Great Britain. P.O. for some time known also as Boghead naphtha, has become of late years an important manufacture in England and Scotland. In 1847 James Young, founder of the English manufacture of paraffin, had his attention called to a petroleum spring at Alfreton, Derbyshire, from which he distilled a light thin oil for burning in lamps, obtaining at the same time a thicker oil for lubricating machinery. After a year or two the supply began to fail, but Mr. Young, noticing that petroleum was dropping from the sandstone roof of a coal-mine, conjectured that it originated by the action of heat on the coal-seam, the vapor from which had condensed in the sandstone, and inferred that it might be produced artificially. Following up this idea, he tried many experiments, and ultimately succeeded, by distilling coal at a low red-heat, in obtaining a substance resembling petroleum, which, when treated in the same way as the natural petroleum, yielded similar products. The obtaining of these oils and the solid substance paraffin from coal formed the subject of his notable patent, 1850, Oct. 17. In 1860 and 64, long and costly litigations as to the validity of his patent took place in Edinburgh and London, resulting mostly in his favor. Many years ago, Reichenbach had, by distilling 100 lbs. of pit-coal, obtained nearly two ounces of an oily liquid exactly resembling natural naphtha; and various other chemical writers were appealed to, as proving that methods substantially the same as Mr. Young's were previously known and practiced. But it seems to have been admitted, that previous to his patent, no one had succeeded in producing the oil on a commercial scale.

The processes by which the oil and paraffin are obtained are simple. The material best adapted for the purpose was for years believed to be Boghead coal, a very rich cannel coal, occurring in a field of limited extent near Bathgate, Linlithgowshire. All cannel coals, however, give the same products, and some of them in nearly as large quantity; but shale is now generally used and treated in the same way. The coal is broken into fragments like road-metal, and gradually heated to redness in cast-iron retorts similar to those used for coal-gas (see GAS). The retorts are usually upright, about 10 ft. long and 14 inches in diameter at the bottom, tapering to 12 inches at the top, and built in sets of 3, 4, or 6, so that one fire may heat each set. The coal is fed by means of a hopper on the top of the retort, and after passing through it at a low red-heat, is drawn out as coke at the bottom, where there is a water lute to prevent the escape of oil or gas. There is a spherical valve in the hopper, counterpoised with a weight, which closes the retort at the top. The volatile matters distilled from the coal are conducted by a pipe to the condensers (similar to those used for coal-gas), where they are condensed into a thick black oil, of a specific gravity

of about 0·900, with a little water. Great care is necessary to prevent the heat from becoming too high, because gas and gas-tar, and not paraffin oil, are obtained when coal or shale is distilled at a high temperature. A ton of Boghead coal gave about 120 gallons of crude oil.

The crude oil from the first distillation is then distilled again in long cylindrical malleable-iron stills. From this second distillation a 'green oil' is obtained, and the residue is removed as coke from the bottom of the still. This oil is then mixed with 5 to 10 per cent. of sulphuric acid, and afterward with about the same quantity of soda. the mixtures being made in circular tanks with revolving stirrers. Both the acid and the soda mix with impurities, which fall to the bottom as heavy tarry matters, and are run off by a stop-cock, till only the clear supernatant oil remains. After being so far purified, the oil undergoes three further distillations, being at the same time treated with strong acid (1 per cent.) and soda. The final result is, that a small quantity of light naphtha is obtained in the later distillations, three-fourths of what is left being a light and nearly colorless oil used for burning in lamps. It is displaced now to a great extent by kerosene oil. The remainder, a thicker oil containing paraffin, is pressed in a hydraulic press, which squeezes out the greater portion of the paraffin, leaving an oil which is sold for lubricating machinery.

The crude paraffin, after being subjected to hydraulic pressure three or four times, is chiefly purified, by repeated crystallizations, from naphtha. Steam is afterward blown through it in its melted state; and when finally treated with 3 per cent. of animal charcoal, it is an exquisitely beautiful substance, resembling the purest white wax. It is largely manufactured into candles, which equal, or even excel, in appearance those made from wax, and are only about half as costly. Paraffin has a number of curious minor applications. Petroleum paraffin, an identical substance, has now largely displaced it: the crude Amer. petroleum yields 70 per cent. of its weight of P.O.

Shale naphtha, or 'shale oil,' is a substance which has been manufactured, for many years, from bituminous shales. Partly because the Boghead coal has become practically exhausted, but chiefly because the volatile products from it are more easily purified than from any coal, beds of bituminous shale found in the carboniferous formation are now used in Scotland as the raw material from which paraffin oil and paraffin are obtained. Previous to 1856, these shales were turned to no account: see SHALE.

This manufacture was started in the United States some years ago, but was destroyed by the discovery and development of the petroleum industry. See PETROLEUM.

PARAGENESIS OF MINERALS, *păr'ă-jĕn'ĕ-sĭs* [Gr. *para*, side by side; *genĕsis*, origin, source]: a term in mineralogy applied to crystalline compounds whose mass is made up of crystals interblended in imperfect or irregular forms. PARAGENETIC, a. *păr'ă-jĕn-ĕt'ĭk*, or PAR'AGEN'IC, a. *-jĕn'ĭk*, applied to bodies having peculiarities of structure, character, and the like; originating at the commencement.

PARAGLOBULIN, n. *păr'ă-glŏb'ū-lĭn* [Gr. *para*, beside, close to, and *globulin*]: a form of *globulin* derived from the blood.

PARAGOGE, n. or PARAGOGY, n. *păr'ă-gō'jĭ* [Gr. *paragōgē*, a leading or conducting beyond—from *para*, beyond; *agō*, I lead]: the addition of a letter or syllable to the end of a word. PAR'AGOG'IC, a. *-gŏj'ĭk*, or PAR'AGOG'ICAL, a. *-ĭ-kăl*, pertaining to the lengthening of a word by the addition of a letter or syllable.

PARAGON, n. *păr'ă-gŏn* [OF. *paragon;* F. *parangon*, a pattern or touchstone by which the goodness of things is tried—from It. *paragone*, a comparison; Sp. *paragon*, model, example: Sp. *para con*, in comparison with]: a model by way of distinction; something of superior excellence or perfection. PAR'AGONED, a. *-gŏnd*, paralleled.

PARAGRAPH, n. *păr'ă-grăf* [F. *paragraphe*—from mid. L. *paragraphus*—from Gr. *paragraph'os*, a mark in the margin to distinguish the divisions of a written composition—from *para*, side by side; *graphō*, I write]: a distinct part of a connected discourse or writing; the section of a chapter relating to a particular point; a short piece of news or notice in a newspaper; a mark of reference (¶). PAR'AGRAPH'IC, a. *-grăf'ĭk*, or PAR'A-GRAPH'ICAL, a. *-ĭ-kăl*, consisting of short divisions or paragraphs. PAR'AGRAPH'ICALLY, ad. *-lĭ*.

PARA'GRASS. See PIASSABA.

PARAGUAY, *pâ-râ-gwī'* or *pâ râ-gwā:* a republic of South America. Its frontiers, previous to the war of 1865–70, were not well defined, but on its conclusion

were fixed by treaty and the country now extends from about 22° to 27° 35′ s. lat., and from 54° 35′ to 61° 40′ w. long., forming the peninsula between the rivers Paraguay and Paraná. It is bounded n. and n.e. by Brazil, s.e., s., and s.w. by the Argentine Republic and n.w. by Bolivia; area estimated 121,973 sq. m. In 1857, before the war, the pop. was estimated 1,337,439, consisting of whites of Spanish decent, native Indians, negroes, and a mixture of these several races; 1873 it had fallen to 221,079; but in 1899 had risen to 635,571 of whom 18,188 were foreigners and 100,000 were members of wild tribes inhabiting El Gran Chaco.

Political Divisions, etc.—The country is divided into two sections by the Paraguay river, the eastern section being called El Paraguay Oriental and the western El Gran Chaco or El Paraguay Occidental. For the purposes of government, Paraguay is divided into 84 departments, which are grouped to form 24 electoral districts, three of the districts being comprised in the capital and one consisting only of Villa Hayes and its territory. The largest city and capital of the republic is Asunción (q.v.), pop. (1900) 51,719, including 4,541 foreign residents. Other cities and towns are: Villa Rica (25,074 inhabitants), connected by railway with the capital; Villa Concepción (13,654), commercially important, a port of entry and delivery on the Paraguay river; Caazapá (14,914); Luque (14,777), San Estanislao (10,920); Villa del Pilar (5,740); Villa Encarnación (10,742); Yuty (9,800); Capiatá (9,207); Carapeguá (13,930); Ytauguá (6,624); Villeta (7,072); Villa San Pedro (7,987); and Paraguanri (9,128). A consequence of the government's efforts to encourage immigration and colonization is seen in the establishment of the following colonies:—Villa Hayes Colony, nearly opposite Asunción in El Gran Chaco, settled by families from Switzerland, France, Italy, Belgium, Germany, Austria, and Spain; San Bernardino Colony, settled principally by Germans; Colonia Nacional, on the railway from the capital to Villa Encarnación; Nueva Alemania Colony, in the department of San Pedro; Elise, or San Antonio, Colony, in the department of San Lorenzo de la Frontera; Nueva Australia Colony, containing Australians, English, and Paraguayans; Colonia Cosme, in the department of Caazapá, also inhabited by Australians; Colonia Guillermo Tell, a Swiss settlement; and the Hohenau Colony, a small community of German, Brazilian, and Paraguayan coffee planters.

Topography and Hydrography.—A mountain chain called Sierra Amambay, running in the general direction of n. to s., and bifurcating to the e. and w. toward the s. extremity, under the name Sierra Maracayu, divides the tributaries of the Paraná from those of the Paraguay, none of which are very large, though they

are liable to frequent and destructive overflows. The n. portion of Paraguay is in general undulating, covered by low, gently swelling ridges, separated by large grass-plains, dotted with palms. There are mountains in the n.e. and n.w. corners. The s. portion is one of the most fertile districts of South America, consisting of hills and gentle slopes richly wooded, of wide savannas, which afford excellent pasture-ground, and of rich alluvial plains, some of which, indeed, are marshy, or covered with shallow pools of water (only one lake, that of Ypao, deserving special notice), but a large proportion are of extraordinary fertility and highly cultivated. The position of Paraguay Oriental has been aptly compared with that of the state of Illinois, for its southern boundary is at the confluence of two great rivers, and more than 800 miles above Buenos Ayres and the La Plata estuary. Of these rivers, one, the Paraguay, forms the western boundary below Asunción, while, above the capital, it passes between the eastern and western divisions of the republic, as already stated; the other, the Paraná, separates Paraguay from the Argentine Republic and Brazil on the south and southeast. A large part of the territory lying between these great streams is not yet well known. The Pilcomayo river, flowing southeastward from Bolivia, forming the southern boundary of Gran Chaco, and joining the Paraguay below Asunción, is navigable for a distance of 150 miles from its mouth. The Paraná flows 1,367 miles from its source in Goyaz, Brazil, before uniting with the Paraguay; the latter is about 1,800 miles long; both have large tributaries in Paraguay Oriental.

Mineral Resources and Soils.—The northern part of Paraguay is covered with limestone, while the southern is of sandstone formation. Marble is abundant in the north, iron in the south. Several veins of copper have been found. Other minerals are: kaolin, in the department of Caápucú, Ibicuí, Quiquio, Villa Rica, Cordillera, Villeta, and Luque; talc, graphite; serpentine stone, basalt, near Villa Encarnación; porphyry, and arsenic. There are four distinct varieties of soil, namely, (1) sandy, either white or red, the latter being fertile; (2) a good agricultural soil, consisting of clay and quartz, oxide of iron, lime, and miscellaneous substances; (3) humus, characteristic of forest lands; and (4) the black alluvial deposits, prevailing in western Paraguay.

Climate.—Paraguay is regarded as a sanitarium by the inhabitants of some of the neighboring countries. The mean temperature at Asunción is about the same as that of Cairo, Egypt; Hongkong, China; and Caracas, Venezuela, while the mountainous interior regions are decidedly cooler. Rain is abundant throughout the year; snow is entirely unknown; storms, with accompanying high winds and very severe thunder and lightning, occur frequently.

Forests and Agriculture.—The banks of the rivers Paraná and Paraguay are occasionally belted with forest; but, in general, the low lands are destitute of trees. Much valuable timber is found in the forests, and the wooded districts along the rivers possess ready means of transport. Among the trees are several species of dyewood; several trees which yield valuable juices, as the India-rubber and its cognate trees; and an especially valuable shrub, the *Maté* (q.v.), or Paraguay tea-tree, which forms one of the chief articles of commerce, being in general use throughout La Plata, Chili, Peru, and other parts of South America. The tree grows wild in the n.e. districts, and the gathering of its leaves gives employment in the season to a large number of the native population. Many trees yield also valuable gums. Wax and honey are collected in abundance, as is also cochineal; and the medicinal plants are very numerous. The chief cultivated crops are maize, rice, coffee, cocoa, indigo, manioc, tobacco, sugar-cane and cotton. Nearly three-fourths of the land is national property, consisting partly of the lands formerly held by the Jesuit missions, partly of lands never assigned to individuals, partly of lands confiscated in the course of the revolutionary ordeal through which the country has passed. The national estates have mostly been let out in small tenements, at moderate rents. Under the dictator Francia (1814–40), agriculture made considerable progress, and the breed of cattle and horses was much improved, and the stock increased.

Manufactures.—There are in the entire country 2,298 business houses, with a capital of $66,673,000, currency; and 1,094 industrial establishments, capitalized at $135,448,066, currency. The most remarkable industrial product is the famous *ñanduti* (cobweb) lace. Cotton and woolen fabrics are manufactured in a primitive fashion. Wines are made from grapes or oranges. There are manufactories of cigars, ice, soap, and matches; also a number of tanneries, potteries, and flour mills.

Commerce, Navigation, etc.—In 1901 the exports were valued at $2,529,307 gold, and the imports at $3,003,658 gold. The total foreign trade of Paraguay during 1906 was given as follows: exports, $2,695,139 gold, and imports, $6,267,294 gold. Communication with Buenos Ayres and Montevideo is furnished by a great number of steamboats. The Paraguayan Central railway runs from Asunción to Pirapó, 155 miles. Government telegraph lines extend from Asunción northward to Villa Concepción, and southward to the Argentine frontier, connecting with the lines of that republic at El Chaco. Telephone systems have been established in several of the larger towns. In 1905 there were 157 postoffices.

Weights, Measures, and Money.—Arobe = 25 pounds; cuadra = 78.9 yards; league (land) = 4.633 acres;

quintal = 100 pounds. Paraguay has no gold or silver coins of its own stamping. The silver *peso* of the other South American countries circulates there, and has the same value as in the issuing country.

Finances.—The government's revenue for 1906 was $2,126,746 and the expenses $1,873,304. The total debt of the nation is $12,303,592 exclusive of 35,000,000 *pesos* of paper currency (about $2,800,000) and the internal debt, of which there are no available statistics.

Education and Religion.—Article 3 of part 1, chapter 1, of the constitution provides: 'The religion of the state is the Roman Catholic Apostolic; Congress, however, shall not have power to forbid the exercise of any other religion within the territory of the republic. The chief prelate of the Paraguayan church shall be a Paraguayan.' Article 8 declares: 'Primary instruction is compulsory,' directing Congress to 'promote by all possible means the instruction of the citizens.' Professors at the university and colleges are appointed by the president of the republic, though nominated by the councils of those institutions. The entire educational system was, from 1609 to 1767, entrusted to the Jesuits; the tendency to nationalize it has grown strong principally during the last thirty years. In all schools the Spanish language is taught, and the Guaraní, though still the tongue of the common people everywhere outside of the larger towns, is gradually being displaced; it is even prohibited within the precincts of the university and colleges. The number of schools—normal, high, primary, and private—is 383, with an aggregate attendance of more than 39,000. A school of agriculture and five colleges are supported by the government. The National University, founded 1890, has faculties of law and social sciences, medicine, mathematics and notarial training. Nearly 700 students attend the university and national colleges. There is a national library, containing over 6,000 volumes.

Government, including Judiciary.—The constitution of 1870, Nov. 24, now in force, vests the powers of the government in three co-ordinate branches—the legislative, executive, and judicial. The national congress, consisting of senate and chamber of deputies, meets each year at Asunción. Senators, elected by the people, by universal suffrage, one senator for each 1,200 inhabitants, serve for six years. Deputies, similarly chosen, but in the proportion of one for each 6,000, serve four years. 'The executive power,' says the constitution, 'shall be vested in a citizen, to be called President of the Republic of Paraguay. In case of sickness, absence from the capital, death, resignation, or dismissal of the President, the executive power shall be exercised by the Vice-President.' Both president and vice-president are chosen by an electoral college, serve for four years, and 'cannot be re-elected except after the lapse of two presidential terms.' Numerous provisions of the constitution

are designed to guard against the revival of dictatorships, or undue extension of the powers of the executive. In regard to the cabinet, Article 104 provides: 'Five ministers or secretaries, respectively called of the Interior, Foreign Relations, the Treasury, Justice, Worship and Public Instruction; and War and the Navy, shall attend to the business of the nation, and legalize with their signatures the acts of the President. Those acts without their signatures shall have no efficiency.' These ministers are responsible to congress. The judicial power is vested in a supreme court, consisting of three justices, and having 'the right to inspect and supervise the action of all inferior courts'—that is, in practice, the courts of appeal, and criminal, police, first instance, and justices' courts.

History.—The history of Paraguay is highly interesting. It was discovered by Cebastian Cabot 1526; but the first colony was settled 1535 by Pedro de Mendoza, who founded the city of Asunción, and established Paraguay as a providence of the viceroyalty of Peru. The warlike native tribe of the Guaranis, however, a people who possessed a certain degree of civilization, and professed a dualistic religion, long successfully resisted the Spanish arms, and refused to receive either the religion or the social usages of the invaders. In the latter half of the 16th c., the Jesuit missionaries were sent to the aid of the first preachers of Christianity in Paraguay; but for a long time they were almost entirely unsuccessful, the effect of their preaching being in a great degree marred by the profligate and cruel conduct of the Spanish adventurers, who formed the staple of the early colonial population. In the 17th c. the home government consented to place in their hands the entire administration, civil as well as religious, of the province—which, from its not possessing any of the precious metals, was of little value as a source of revenue—and in order to guard the natives against the evil influences of the bad example of European Christians, gave to the Jesuits the right to exclude all other Europeans from the colony. From this time forward, the progress of civilization and Christianity was rapid. The legislation, the administration, and the social organization of the settlement were shaped according to the model of a primitive Christian community, or rather of many communities under one administration; and the accounts preserved of its condition appear to present a realization of the ideal of a Christian Utopia. On the expulsion of the Jesuits from Paraguay in 1768, the history of which is involved in much controversy, the province was again made subject to the Spanish viceroys. For a time the fruits of the older civilization maintained themselves; but as the ancient organization fell to the ground, much of the work of many years was undone; the communities lapsed into disorganization, and by degrees much of the

old barbarism returned. In 1776 Paraguay was transferred to the newly formed viceroyalty of Rio de la Plata; and 1810 it joined with the other states in declaring its independence of the mother kingdom of Spain, which independence its isolated position enabled it, earliest of them all, to establish completely. In 1814 Dr. Francia, originally a lawyer, and secretary of the first revolutionary junta, was proclaimed dictator for three years; and 1817 his term of the office was made perpetual. He continued to hold it till his death 1840, when anarchy ensued for two years; but, in 1842, a national congress elected two nephews of the dictator. Don Alonso and Don Carlos Antonio Lopez, joint consuls of the republic. In 1844 a new constitution was proclaimed, and Don Carlos was elected sole president with dictatorial power, which he exercised till his death 1862, when he was succeeded by his son, Don Francisco Solano Lopez, whose name became notorious in connection with the tragic struggle of 1865-70, in which the Paraguayans made a heroic but unavailing fight against the combined forces of Brazil, the Argentine Confedation, and Uruguay. The war was brought to a close by the defeat and death of Lopez at the battle of Aquidaban, 1870, Mar. 1. In 1870, June, a congress voted a new constitution, which was proclaimed Nov. 25. Paraguay was till 1876 partially occupied by Brazilian troops, and was virtually a Brazilian province. To Brazil, Paraguay ceded the territory on the north and northeast; to Argentina, by the treaty of 1876, Feb. 3, the district south of the Pilcomayo. But the President of the United States, 1878, Nov. 12, awarded to Paraguay the district north of the Pilcomayo, which Argentina claimed.

For a short time after the death of Lopez the government was administered by Cirilo Rivarola, Carlo Loizago and José Diaz de Bedoza. Rivarola later became president but before a year had passed resigned (and was subsequently assassinated), and the vice-president, Salvador Jovellanos, succeeded him. Since then the presidents have been as follows: Gill, 1874–5 (assassinated); Uriarte, 1875–8; Baredo, 1878–9; Saguier, 1879–81 (deposed); Caballero, 1881–6; Escobar, 1886–90; Gonzalez, 1890–4 (deposed); Moriñigo, 1894; J. B. Egusquiza, 1894, Nov. –98; Aceval, 1898–1902; Juan Ezquarra, 1902–4; Juan B. Gaona, 1904–5, Dec.; Baeza, 1905, Dec.–1906, Nov. 25; Berrigno Ferreira, 1906, Nov. 25–1908, July 5; Emiliano G. Naveiro, since 1908, July 5.

In 1908 there was much dissatisfaction with the government and on June 30 a revolt broke out in Asunción, and after a week of continuous fighting the government troops were defeated, the ministers forced to flee for refuge to the foreign legations and the city was put under martial law. On July 5 Emiliano G. Naveiro, vice-president under the former chief magistrate (Gen. Berrigno Ferreira), was proclaimed president.

PARAGUAY′ River: important river of S. America, affluent of the Parana (q.v.), rising in the Brazilian province of Matto Grosso, on a plateau of red sandstone; lat. 13° 30′ s., long. about 55° 50′ w.; 9,535 ft. above sea-level. The sources of the river are a number of deep lakes, and eight m. from its source the stream already has considerable volume. After a s.w. course, through a level country covered with thick forests, the P. is joined from the w. by the Jauru, lat. 16° 30′ s. It then continues to flow s. through the Marsh of Xarayes, which, during the season when the stream rises, is an expansive waste of waters, stretching far on each side of the stream, and extending n. to s. about 200 m. Thence its course is generally southward, forming from 20° to 22° s. the boundary between Brazil and Bolivia; thence flowing s.s.w. through the territories of Paraguay to its junction with the Parana, lat. 27° 17′ s., a few miles above the town of Corrientés. Its chief affluents are the Cuyaba, Tacoary, Mondego, and Apa on the left, and the Jauru, Pilcomayo, and Vermejo on the right. Except in the marshy districts, the country on both banks of the river is rich and fertile, and abounds in excellent timber. The entire length of the river is estimated 1,800 m.; it is on an average about half a mile in width, and is navigable for steamers to the mouth of the Cuyaba, 100 m. above the town of Corumba. The waters of the P., which are free from obstructions, were declared open to all nations 1852; and now Brazilian mail-steamers ply monthly between Montevideo and Cuyaba, on the river of the same name, one of the head-waters of the P.; and there are several lines of steamers between Buenos Ayres and Asuncion.

PARAGUAY TEA, n. *păr′ă-gwī tē:* tea prepared in all parts of S. America, from the dried leaves of the Brazilian holly, *Ilex par′ăguayen′sis*, ord. *Aquĭfoliăcĕæ;* called also *Yerbamaté* (see Maté). Paraguay′an, a. *-gwī′ĕn*, of or belonging to Paraguay.

PARAHIBA, *pâ-râ-ē′bâ:* one of the most eastern maritime provinces of Brazil, bounded n. by Rio Grande do Norte, s. by Pernambuco, w. by Ceara, and e. by the Atlantic; 31,500 sq. m. It is traversed by the river P., by a number of smaller streams, and by mountainous ridges, between which are valleys, whose soils are mostly dry and sandy. Cotton of excellent quality, manioc, and tobacco are grown; and cotton, sugar, and timber are exported. Cap. Parahiba (q.v.).—Pop. of province (1890) 457,232.

PARAHI′BA: town, seaport of Brazil, cap. of the province of P., and on the river of P.; about 10 m. from the sea. Besides the cathedral, it contains a number of religious houses, two colleges, and other educational institutions. The port is good for small vessels, and the coasting-trade is large.

PARAHIPPUS, n. *păr-a-hĭp′ŭs* [prefix *para-;* Gr. *hippos*, a horse]: in *paleon.*, genus of *Perissodactyle Ungulates*, from the Pliocene of North America, having affinity with the horse and tapir.

PARAHYUS, n. *păr-a-hī′ŭs* [prefix *para-*; Gr. *hus*, *huos*, a swine]: in *paleon.*, genus of Suida, from the Lower Eocene of America. It was apparently highly specialized, and, as a genus, short-lived. It attained a much greater size than the true lineal forms, and the number of its teeth was much reduced.

PARALEIPSIS, n. *păr′ă-līp′sĭs* [Gr. *paraleip′sis*, omission—from *para*, beside; *leipō*, I leave]: in *rhet.*, a figure of speech expressing that a speaker pretends to omit or pass by something in order to enable him to mention the same with greater effect, and excite the emotion of the hearers.

PARALIPOMENA, n. *păr′ă-lĭ-pŏm′ĕ-nă* [Gr. *paraleîpom′ĕna*, things omitted—from *para*, beside; *leipō*, I leave]: books of a supplementary character containing things omitted—applied to the Books of Chronicles in the Septuagint and Vulgate versions.

PARALLAX, n. *păr′ăl-lăks* [Gr. *parallax′is*, alternation, change—from *para*, beside, beyond; *allassō*, I change]: the apparent angular shifting of an object, arising from a change in the observer's point of view.—*Parallax*, in astron., is the difference between the apparent place of a heavenly body, as seen by an observer from any station, and its true position, as supposed to be seen from the centre of the earth or from the centre of the sun. When an object at M is looked at from P,

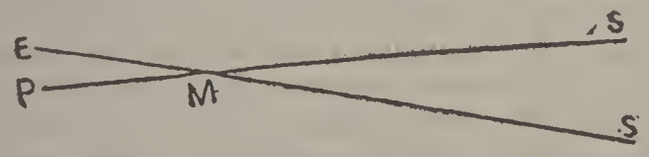


Fig. 1.

it appears in line with some object, S; but after the observer has moved to E, M has apparently retrograded to a position in line with S′; this apparent retrogression is denominated *parallax*. The angle PME is called the 'angle of parallax,' or the 'parallactic angle,' and is the measure of the amount of parallax. To astronomers, the determination of the parallax of the heavenly bodies is of utmost importance, for two reasons—first, from the necessity of referring all observations to the earth's centre, i.e., so modifying them as to make it appear as if they had been actually made at the earth's centre; secondly, because parallax is our only means of determining the magnitude and distance of the heavenly bodies. The *geocentric* or *daily* parallax—as the apparent displacement of a heavenly body, due to its being observed from a point on the surface of the earth, instead of from its centre, is called—is determined as follows: Let P and P′ be two stations on the surface of the earth (fig. 2), E its centre, M the object to be observed, and Z and Z′ the zeniths respectively of the observers at P and P′ (points which, if possible, should be on the same meridian exactly); then at P and P′ let the *zenith distances*, ZPM and Z′P′M, be observed simulta-

neously, and since the latitudes of P and P′, and consequently their difference of latitude, or the angle PEP′, are known, from these three the angle PMP′ (the sum of the parallaxes at P and P′) is at once found; and then, by a trigonometrical process, the separate angles or parallaxes PME and P′ME. When the parallax of M, as

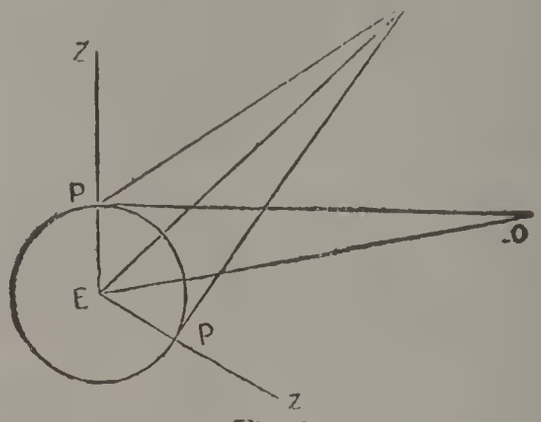


Fig. 2.

observed from P, is known, its distance from E, the centre of the earth, can be at once found. When the heavenly body is on the horizon, as at O, its parallax is at a maximum, and is known as a *horizontal* parallax. The geocentric parallax is of use only in determining the distances of those heavenly bodies at which the earth's radius subtends a considerable angle; and as the moon and Mars (when in opposition) are the only such bodies, the parallax of the other celestial bodies must be determined in a different manner. The parallax of the Sun (q.v.) is found by observation of the *transit* of Venus across his disk—a much more accurate method than that above described. The parallaxes of the other planets are easily determined from that of Mars.

In the case of the fixed stars, at which the earth's radius subtends an infinitesimal angle, it becomes necessary to make use of a much larger base-line than the earth's radius, and as the largest we can employ is the radius of the earth's orbit, it accordingly is made use of, and the displacement of a star, when observed from a point in the earth's orbit, instead of from its centre, the sun, is called the *annual* or *heliocentric* parallax. Here the base-line, instead of being, as in the former case, 4,000 m., is about 92,000,000 m.; and the two observations necessary to determine the parallactic angle are made from two points on opposite sides of the earth's orbit, at an interval as nearly as possible of half a year. Yet, notwithstanding the enormous length of the base-line, it bears so small a proportion to the distances of the stars, that only in three or four cases have they been found to exhibit any parallactic motion whatever, and in no case does the angle of parallax amount to 1″ (see STARS). The geocentric horizontal parallax of the moon is about 57′ 4″·2; that of the sun, about 8″·6; and of the double star, 61 *Cygni*, the heliocentric parallax has been determined by Bessel to be ·348″, equivalent to

about 15-millionths of a second of geocentric horizontal parallax. Parallax affects every observation of angular measurement in the heavens, and all observations must be corrected for parallax, or, in astronomical phrase, referred to the earth's centre, before they can be made use of in calculation. The position of a body when noted from the surface of the earth is called its *apparent* position; and when referred to the centre, its *real* position. PAR'ALLAC'TIC, a. *-lăk'tĭk*, or PAR'ALLAC'TICAL, a. *-tĭ-kăl*, pertaining to a parallax.

PARALLEL, a. *păr'ăl-lĕl* [GR. *parallēlos*, beside each other, èquidistant—from *para*, side by side, as if for comparison; *allēlon*, one another: L. *parallēlus:* F. *parallèle*]: lying side by side, and having always an equal distance from one another; having the same direction, never meeting, no matter how far produced; equal in all essential points; like; similar: n. a line which is equidistant from another line throughout its whole length; parallel lines are those that never meet, however far produced; a circle of latitude on the globe; anything equal to another in all essential particulars; resemblance; a comparison made; v. to place or set so as to be parallel; to equal; to resemble; to compare. PAR'ALLELING, imp. PAR'ALLELED, pp. *-lĕld*. PAR'ALLELLY, ad. *-lĭ*. PAR'ALLELISM, n. *-ĭzm*, state of being parallel; resemblance; comparison; in *Heb. poetry*, the correspondence of two successive lines. PARALLEL SAILING, sailing on a parallel of latitude. PARALLEL LINES, or PARALLELS, in *milit.*, trenches cut in the ground before a fortress, roughly parallel to its defenses, to give cover to the besiegers from the guns of the place. The parallels are usually three, with zigzag trenches leading from one to another. The old rule used to be to dig the first at 600 yards distance, but the improvements in artillery have rendered a greater distance necessary; and at Sebastopol, the allies made their first trench 2,000 yards from the walls. The third trench is very near to the besieged works, and from it saps and zigzag approaches are directed to the covert-way. PARALLEL CIRCUIT, see ELECTRICAL DISTRIBUTION. PARALLEL DISTRIBUTION, see ELECTRICAL DISTRIBUTION. PARALLEL MOTION, in the *steam-engine*, a contrivance which converts a circular motion into a rectilinear one. PARALLEL SPHERE, in *geog.*, that position of the sphere in which the equator coincides with the horizon, and the poles are in the zenith and nadir, being the appearance that the sphere would have to a spectator placed at the edge. PARALLEL FORCES, in *mech.*, forces which act in directions parallel to each other (see below). PARALLELS OF ALTITUDE, small circles of the sphere parallel to the horizon. PARALLELS or CIRCLES OF LATITUDE, in *geog.*, circles drawn round the surface of the earth parallel to the equator. They may be supposed to be the intersections with the

earth's surface of planes which cut the earth at right angles to its axis. The greatest of these circles is the equator, which has the centre of the earth for its centre, the radius for its radius, and is equally distant at all points from each pole. It is evident that, of the others, those next the equator are greater than those more remote, and that they become less and less, till at the poles they vanish altogether. The radius of any one circle is evidently equal to the earth's radius multiplied into the cosine of its latitude or distance from the equator. The rotary velocity of the earth's surface, about $17\frac{1}{3}$ m. per minute at the equator, is only $8\frac{2}{3}$ m. in lat. 60°; in lat. $82\frac{1}{2}$° (most northerly point yet reached) is only $2\frac{1}{4}$ m.; and in lat. $89\frac{1}{2}$° (within 35 m. of the pole) is not more than 267 yards per minute. The most important parallels of latitude are the *Tropics of Cancer* (23° 28′ n. lat.) and *Capricorn* (23° 28′ s. lat.), and the *Arctic* (66° 32′ n. lat.) and *Antarctic Circles* (66° 32′ s. lat.). Parallels in *astron.* are circles drawn parallel to the ecliptic. PARALLELS OF DECLINATION, in *astron.*, circles of the sphere parallel to the equator. PARALLEL COPING, coping of equal thickness throughout.

PARALLELEPIPED, n. *păr′ăl-lĕl-ĕ-pīp′ĕd* (erroneously written *Parallelopiped*), or PAR′ALLELEPIP′EDON, n. *-pīp′ĕ-dŏn* [Gr. *parallēlos*, beside each other, equidistant; *epipĕdos*, on the ground, or on a level with it]: oblong solid figure, having six faces, the faces being invariably parallelograms, and any two opposite faces equal, similar, and parallel. If the faces are all squares, and consequently equal, the P. becomes a cube. The volume of a P. is found by multiplying the area of one face by its distance from the opposite one.

PAR′ALLEL FORCES: forces which act on a body in directions parallel to each other. Every body, being an assemblage of separate particles, each of which is acted on by gravity, may thus be considered as impressed upon by a system of parallel forces. The following demonstration exhibits the mode in which the amount and position of the resultant force are found: Let P and Q be two parallel forces acting at the points A and B respectively, either in the same (fig. 1) or in opposite (fig. 2) directions; join AB, and in this line, at the points A and B, apply the equal and opposite forces S and S, which counterbalance each other, and therefore do not affect the system. Find M and N (see COMPOSITION AND RESOLUTION OF FORCES), the resultants of P and S, and Q and S, respectively, and produce their directions till they meet in D, at which point let the resultants be resolved parallel to their original directions; then there are two equal

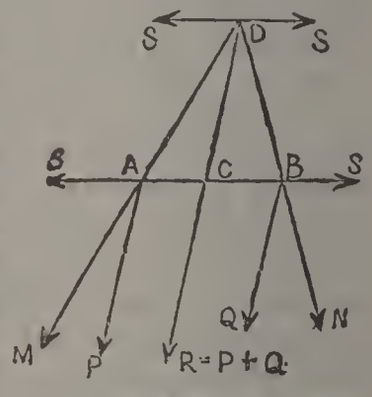


Fig. 1.

forces, S and S, acting parallel to AB, but in opposite directions, and thus, as they counterbalance each other, they may be removed. There then remain two forces, P and Q, acting at D, in the line DC, parallel to their original directions; and their sum (fig. 1) or difference (fig. 2), represented by R, is accordingly the resultant of

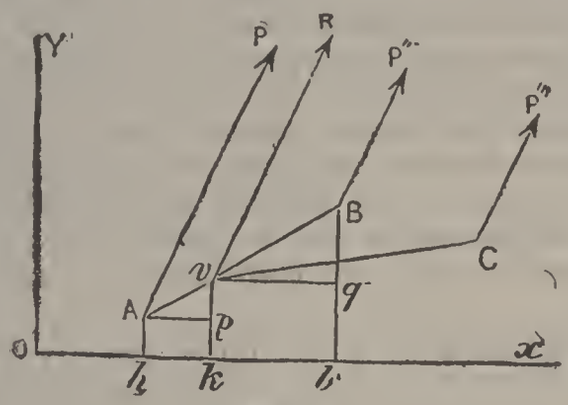


Fig. 2.

the original forces at A and B. To find the position of C, the point in AB, or AB produced, through which the resultant passes, it is necessary to make use of the well-known property denominated the *Triangle of Forces* (q.v.), according to which the three forces S, M, and P are proportional to the lengths of AC, AD, DC, the sides of the triangle ADC; then S : P : : AC : CD, similarly Q : S : : DC : CB, therefore Q : P : : AC : BC, and Q $\pm$ P or R : P : : AC $\pm$ BC or AB : BC, from which proportions we derive the principle of the lever, P $\times$ AC = Q $\times$ BC, and also that R $\times$ BC = P $\times$ AB, whence $BC = \frac{P}{R} \times AB$, and the point C is found. The failing case of this proposition is when P and Q acting in opposite parallel directions at

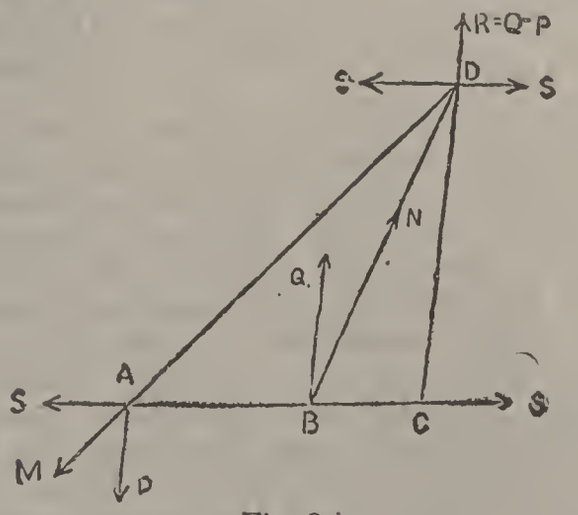


Fig. 3.

different points are equal, in which case the resultant R = Q — P = Q — Q = O. In all other cases there is a progressive motion, such as would be caused by the action of a single force R (= Q $\pm$ P) acting at the point C in the direction CR; but in the failing case, since R = O, there is no progressive motion, but a rotatory movement round the

centre of AB. See COUPLE. It is of no consequence whether A and B be the true points of application of the forces P and Q, provided their directions when produced pass through these points; and the point of application of the resultant need not be in the line joining the points of application of the component forces, but its direction must when produced pass through C. If there be more than two parallel forces, the resultant of the whole is found by compounding the resultant of the first two with the third in the way given above, thus obtaining a new resultant, which is similarly combined with the fourth force; and so on till the final resulant is found. The centre of gravity is only a special name for the point of application of the final resultant of a number of parallel forces.

PARALLELISM, In psychology, the term parallelism indicates the theory that mental states or processes are always accompanied by bodily states or processes. The theory starts from such familiar experiences as the fact that anger is expressed by tense muscles, a flushed face, etc. Physiology furnishes evidence, too, that the various parts of the nervous system correspond to different kinds of mental facts, e.g., injury to a particular portion of the brain destroys vision. There is also an unmistakable agreement between the increasing complexity of mental life in animals and their increasingly complex nervous organization. These facts give rise to the hypothesis that *every* state of consciousness is registered in bodily structure, and conversely that *every* physiological change is accompanied by a corresponding change of mental content or mental tone. More precisely, the parallelism is supposed to hold between conscious processes on the one hand, and the *nervous* activity and structure on the other. It then becomes the task of 'psycho-physiology' to investigate these relations in detail.

An extension of the same principle is made to include *all* physical facts. Parallelism, then, as a metaphysical theory, states that not only animals are conscious, but also that plants and even inorganic structures have a low range of sensitivity; that the universe, in short, is alive, and that its life is throughout more or less conscious. This conception is sometimes called 'Panpsychism.' The essential reality of the universe is accordingly regarded as expressing itself in two (parallel) ways, physical and psychical, the latter being analogous to our conscious life. When the fundamental unity is emphasized, the conception is termed 'Monism.' The thought that the sum total of the world-consciousness constitutes a 'world-soul,' unitary and personal in character, gives the theory a religious tinge, and identifies it theologically with 'Pantheism.'

PARALLELOGRAM, n. *păr'ăl-lĕl'ō-grăm* [Gr. *parallēlos*, equidistant; *gramma*, a writing or drawing]: in

geometry, four-sided rectilineal figure which has its opposite sides parallel; the opposite sides are therefore equal, and so are the opposite angles. If one angle of a parallelogram be a right angle, all its angles are right angles, and the figure is then called a *rectangular parallelogram*, or, shortly, a *rectangle;* and if at the same time all the sides are equal, the figure is a *square*, otherwise it is *oblong*. If the angles are not right angles, but all the sides are equal, it is called a *rhombus;* and if the opposite sides only are equal, a *rhomboid. The* two lines which connect the opposite corners of a Parallelogram are called its *diagonals;* each bisects the parallelogram, and they bisect each other; the sum of their squares also is equal to the sum of the squares of the sides of the parallelogram.

All parallelograms which have equal bases and equal altitudes are equal in area, whether they be similar in shape or not, and the area of a parallelogram is found by multiplying its base by the height.

PARALLEL'OGRAM OF FOR'CES. See COMPOSITION AND RESOLUTION OF FORCES.

PARALOGISM, *pă-răl'ō-jizm*, [G. *para*, beside, and *logos*, discourse]: a faulty reasoning process, especially one which deceives the reasoner as well as others. A term used in philosophy.

PARAL'YSIS, or PAL'SY: loss, more or less complete, of the power of motion; but by some writers the term is employed to express also loss of sensation. When the upper and lower extremities on both sides, and more or less of the trunk, are involved, the affection is termed *General Paralysis.* Very frequently only one-half of the body laterally is affected, the other side remaining sound; to this condition the term *Hemiplegia* is given. When the paralysis is confined to all the parts below an imaginary transverse line drawn through the body, or to the two lower extremities, the condition is termed *Paraplegia.* When one part of the body, as a limb, one side of the face, etc., is exclusively attacked, the affection is known as *local palsy.* In some cases the loss of sensation and of motion in the paralyzed part is entire; in others it is not so: in the former the paralysis is said to be *complete;* in the latter, *partial.* In the most cases, but not invariably, sensibility and motion are simultaneously lost or impaired. When motion is lost, but sensation remains unimpaired, the affection has received the name of *akinesia* [Gr. *a*, not, and *kinēsis*, motion]. Most rarely, there is loss of sensibility while the power of motion is retained; and such cases the term *anaisthesia* [Gr. *a*, not, and *Kinēsis*, motion]. More rarely, there is loss of sensibility, while the power of motion is retained; and to such cases the term *anaisthesia* Gr. *a*, not, and *aisthesis*, sensation] is applied. This affection occurs most frequently in the organs of sense, e.g., in the

tongue, in which the sense of taste may be lost, without any defect of movement.

Paralysis is in most cases a mere symptom of disease existing in some other part than that apparently affected, e.g., in the brain or spinal cord, or in the conducting nerves between either of these centres and the palsied organ. Sometimes, however, it is a purely local affection, depressing on a morbid condition of the terminal extremities of the nerves. The lesions of the brain and spinal cord which occasion paralysis are somewhat numerous, e.g., congestion, hemorrhagic and serous effusion, softening, fatty degeneration, fibrinous exudation, suppuration, hydatids, various morbid growths, depressed bone from external violence, etc. Paralysis may originate in a nervous trunk, if it is compressed by a tumor, or otherwise mechanically affected, or if it is the seat of morbid action tending in any way to disorganize it; or it may be due to an abnormal condition of the terminations of the nerves, which may be rendered unfit for receiving impressions, either from the external world or from the brain, by prolonged disuse, by continuous or severe pressure, by exposure to cold, by disorganization of their own tissue, or by the depressing action of various metallic poisons, especially lead.

The symptoms and causes of the most important forms of paralysis are, in brief, as follows: *Hemiplegia* [Gr. *hemi*, half; *plēsso*, I strike] affects one *lateral half* of the body, and is that form of paralysis that most commonly occurs in apoplexy and to which the term *paralytic stroke* is properly applied. The parts generally affected are the upper and lower extremities, the muscles of mastication, and the muscles of the tongue on one side. In a well-marked case the patient when seized falls to the ground, all power of motion in the affected arm and leg being lost. The paralysis of the face which accompanies hemiplegia is usually quite distinct from the affection known as *facial palsy*, which is an affection of the facial nerve. It is the motor branches of the fifth or trifacial nerve going to the muscles of mastication which are generally involved in hemiplegia; consequently the cheek is flaccid and hangs down, and the angle of the mouth is depressed on the affected side. The tongue when protruded points toward the paralyzed side, and there is often imperfect articulation, in consequence of the lesion commonly affecting the hypoglossal nerve. Hemiplegia may arise from lesions of various kinds—e.g., (1) from hemorrhage, or some other morbid change in the brain, in which case the paralysis is on the side of the body opposite to the lesion, in consequence of the decussation or crossing over of nervous fibres from one side to the other that occurs at the upper part of the Spinal Cord (q.v.); (2) from spinal disease below the point of decussation above noticed; in this case the paralysis, and the lesion causing it, are

on the same side of the body. It is also sometimes associated with hysteria.

Paraplegia is usually confined to the two lower extremities, but the muscles of the lower part of the trunk and of the bladder and rectum are sometimes affected. There are at least two distinct forms of paraplegia: (1) Paraplegia dependent on primary disease of the spinal cord or its membranes, especially on Myelitis (q.v.); (2) Reflex Paraplegia, i.e., paraplegia consequent on diseases of the kidneys, bladder, urethra. Paraplegia usually comes on slowly, with gradual increase of its symptoms. The reflex form is, of course, by far the most favorable, as it usually abates spontaneously on the subsidence of the primary disease.

Facial palsy, though locally affecting only a small part of the body, is a disorder of sufficient importance to require definite notice. In this affection there is more or less perfect loss of power over all the muscles supplied by the *portio dura*, or facial nerve.

In this disease all power of expression is absent on one side; the features are motionless, the eyelids half open. The other half retains its natural cast, except that, in some cases, the angle of the mouth on that side seems drawn a little awry, in consequence of the want of counterpoise from the corresponding muscular fibres of the palsied side. The patient cannot laugh, or frown, or express any feeling or emotion, with one side of his face, while the features of the other may be in full play; nor can he expectorate or whistle properly. The nerve may be unable to discharge its duties in consequence of disease within the cavity of the skull, and in that case there is very serious danger; but in the great majority of cases the function is interrupted in that part of the nerve which lies incased in the temporal bone, or in the more exposed part which issues in front of the ear; and hence this form of paralysis is generally unattended with any danger to life. It may arise from various causes. Sometimes it is the consequence of mechanical violence, sometimes of the pressure of tumors in the region of the parotid gland, and it very frequently arises from the mere exposure of the side of the face for some time to a stream of cold air.

It remains to notice certain kinds of paralysis which differ either in their characters, or in their causes, from those above described—viz., *Shaking Palsy*, or *Paralysis Agitans;* and the palsies induced by various poisons. *Shaking Palsy* has been defined as 'involuntary tremulous motion, with lessened muscular power in parts not in action, and even when supported; with a propensity to bend the trunk forward, and to pass from a walking to a running pace; the senses and intellect being uninjured.' It is an affection chiefly of old age, and often goes further than to cause an unceasing nodding and wagging of the head in all directions. Somewhat analogous to this form of paralysis is that peculiar

kind of trembling often noticed in persons much exposed to the vapor of mercury—*Mercurial Tremor*. It consists in convulsive agitation of the voluntary muscles, especially when an attempt is made to cause them to act under the influence of the will; a patient with this affection walks with uncertain steps, his limbs trembling and dancing as if they had been hung upon wires. When sitting down he exhibits little or no indication of his disease, but on rising he cannot hold his legs steady, nor direct them with precision; and in severe cases he falls to the ground if not supported. The arms are similarly agitated, and the tongue is usually so tremulous as to render the articulation hurried and unnatural. The disease is especially common in artisans employed in the gilding of metals, particularly of silver, by means of heat; it is also frequent among workers of quicksilver mines in which the crude metal is purified by heat. The duration of the complaint is considerable; it may last two or thee months, or longer, but it is seldom fatal.

For the palsy arising from the absorption of lead, see LEAD-POISONING.

A specific form of paralysis of the lower extremities, consequent on the use of flour from the beans of the *Lathyrus sativus*, or chick pea, is common in certain parts of the world. The ripe bean is an ordinary article of food when made into flour, but it is used generally with wheat or barley flour; it is only when it exceeds one-twelfth part that it is at all injurious, and when it exceeds one-third that the paralysis sets in.

Hemiplegia and paraplegia are serious affections, whose treatment should be exclusively restricted to the physician. When a patient has an attack of hemiplegia (or a *paralytic stroke*), all that should be done before the physician arrives is to place him in a horizontal position, with the head slightly raised, and to remove any impediments presented by the dress to the free circulation of the blood. Should the physician not arrive in an hour or two, it may be expedient to give the patient a sharp purge, if he can swallow, and, without waiting for its action, to administer an injection (or clyter) consisting of half an ounce of oil of turpentine suspended (by rubbing it with the yolk of an egg) in half a pint of thin gruel; and cold lotions may be applied to the head, especially if its surface be hot.

Facial palsy, unless the seat of the disease be within the cavity of the cranium, will usually yield in the course of a few weeks to cupping and blistering behind the ear of the affected side, purgatives, and such other remedies as the physician will prescribe. Exposure to cold air must be carefully avoided during treatment.

Little or nothing can be done to cure *Paralysis Agitans*. In the treatment of *Mercurial Tremor*, the first step is to remove the patient from the further operation of the poison; the second is to remove the poison already ab-

sorbed into the system, which is effected by the administration of iodide of potassium. This salt combines with the metallic poison in the system, and forms a soluble salt (a double iodide of mercury and potassium which is eliminated through the kidneys. Good food and tonics (iron or quinine, or the two combined) should be given.

In the paralysis produced by the use of *Lathyrus sativus*, cases are reported which seem to have been benefitted by good diet, tonics, strychnia, and application of blisters to the loins.

PARALYZE, *păr'ă-līz* [Gr. *paralu'sis*, a loosening at the side, palsy—from *para*, beside; *luō*, I loose]: to deprive of strength, whether of body or mind; to strike or effect as with palsy; to unnerve; to make useless. PAR'ALYZING, imp. PAR'ALYZED, pp. *-līzd*. PARALYSIS, n. *păr-răl'ĭ-sĭs*, palsy; loss of the power of bodily motion or sensation (see above). PARALYTIC, n. *păr'ă-lĭt'ĭk*, a person affected with paralysis. PAR'ALYT'IC, a., or PAR'ALYT'ICAL, a. *-ĭ-kăl*, affected with or inclined to paralysis.

PARAMAGNETIC, a. *păr'ă-măg-nĕt'ĭk* [Gr. *para*, beyond; *magnēs*, a magnet]: a term applied to bodies which are attracted by a magnet; magnetic, as opposed to diamagnetic, having a permeability greater than air. See *Magnetism*. PAR'AMAG'NETISM, n. *-măg'nĕ-tĭzm*, magnetism, as opposed to Diamagnetism.

PARAMARIBO, *pâr-a-măr'ĭ-bo:* a city, capital of Dutch Guiana, on the w. bank of the river Surinam, about 20 m. from its mouth; 5° 45′ n. lat., and 55° 13′ w. long. Pop., about 32,000. It forms a rectangle of nearly a mile and a half in length by three-quarters in breadth. The streets are broad, covered with shell sand, and planted on both sides with orange, lemon, tamarind, and other trees. Near the river, the houses, chiefly of wood, stand somewhat closely together, but in the remoter parts each is surrounded by its garden. The rooms are wainscoted with the choicest woods, and elegantly furnished. In approaching Paramaribo from the sea, Fort Zeelandia is first reached; then the bureau of finance and the court of justice on the Government Plain, which is surrounded by stately cabbage-palms; the governor's house, with shady double avenue of tamarind-trees; lastly, the business streets, stretching along the riverside. There are a Dutch Reformed, Lutheran, Moravian, two Rom. Cath. churches, and two synagogues. Fort Zeelandia has a large and beautiful barrack, with several roomy houses for the officers. Paramaribo has a neat, pleasant, and picturesque appearance—the white-painted houses, with bright-green doors and windows, peeping out from the shady trees, and the river thronged with the tent-boats and canoes constantly arriving and departing. Paramaribo is the only port, except Nickerie Point, at the mouth.

of the Corentyn. 1870-80 the number of ships entering the ports of Dutch Guiana varied from 190 to 230 a year, and the tonnage from 20,000 to 25,000 tons: by far the largest number were British. About a fourth part cleared at Nickerie, a very productive portion of the colony, in which sugar, molasses, and rum are manufactured in large quantities. The Bank of Surinam (cap. $400,000), the only one in the colony, has its headquarters at Paramaribo. The climate of Dutch Guiana is not healthful. From this and other causes, the deaths annually exceed the births. Elephantiasis Arabum and Lepra are fearfully prevalent among the black population of P. and neighborhood. The rainfall (67 inches) varies much, being smallest at Nickerie, in the w., and largest at Montbyou, in the e. of the colony (128 inches). The coast of Dutch Guiana is an alluvial deposit formed by the rivers and by the equatorial stream which flows eastward. Further inland, the soil is diluvial loam, bearing the finest timber-trees; and s. of this line are extensive savannas of white sand, stretching toward the hills and mountains of the interior, which are chiefly of gneiss and granite.

As to religion, about 40,000 of the inhabitants of the colony are reckoned Christians, of whom 22,000 are Moravians (mostly converts by missionary agency), 5,000 Dutch Reformed (mainly in Paramaribo), 13,000 Rom. Catholics. There are about 700 Jews. The Moravian missionaries have missions in the interior, especially among the bush-negroes, who speak a language based on broken English, with Dutch, Portuguese, and Indian additions. The colony possesses 60 schools and 5,000 pupils, of whom 1,300 are in the capital. The great proportion of the births in the colony is illegitimate. The influx of immigrants 1870–80 varied from 2,720 in 1873 to 43 in 1876. The immigrants are mostly from British India. See GUIANA, DUTCH.

PARAMATTA, n. *păr-a-măt'ta:* twilled cloth of cotton and wool, resembling merino in appearance. It was invented at Bradford, in Yorkshire, England; and has become an important manufacture of that place. The weft consists of combed merino wool, and the warp of cotton. It resembles in texture the Coburg and Orleans cloths. This fabric was named from the town P. (q.v.).

PARAMATTA, *păr-a-măt'ta* (spelled PARRAMATTA by Australian authorities): pleasantly situated town of New South Wales, near the w. extremity of Port Jackson, on a small river of the same name; 15 m. by land w.n.w. of Sydney, with which it is connected by steamer and railway. It is the oldest town after Sydney in the colony: its former name was Rosehill. The houses are mostly detached, and the streets are wide and regular, the principal one being about a mile in length. The institutions comprise churches, schools, an orphan and a lunatic asylum, and a prison. 'Colonial tweeds,' 'Paramatta cloths' (made first from wool exported hence), and salt are manufactured. Pop. (1871) 6,103; (1881) 8,433; (1888) 12,000; (1901) 12,560.

PARAMETER, n. *pă-răm'ĕ-tĕr* [Gr. *para*, beside; *metron*, a measure]: a certain constant straight line belonging to each of the three conic sections; the constant quantity which enters into the equation of a curve. P. (called also *Latus Rectum*) denotes, in the case of the parabola, a third proportional to the abscissa of any diameter and its corresponding ordinate; in the ellipse and hyperbola, a third proportional to a diameter and its conjugate. The P. of any diameter is, in the case of the parabola, the same as the double ordinate of that diameter which passes through the focus, and is four times as long as the distance between the diameter's vertex and the directrix. The term P. was formerly used to denote also *any* straight line about a curve, on which its form could be made to depend; or any constant in its equation, the value of which determined the individual curve; but its employment in this sense is now discontinued, except in the theory of homogeneous differential equations, where the constants, for the purpose of aiding the solution, are supposed to vary; and the method is consequently denominated the 'Variation of the Parameters.' In the application of this method to determine the orbital motions of the planets, the 'seven necessary data' (see ORBIT) were called parameters, but for this the term 'elements' is now substituted.

PARAMOS, n. plu. *pă-rā'mōz* [Sp.]: a name given by the Spanish settlers to the high desert tracts of the Andes of S. Amer., covered with stunted trees.

PARAMOUDRA, n. plu. *păr'ă-mô'dră* [a native Irish name]: gigantic flints occurring in the chalk near Belfast, and common in the chalk near Norwich, which seem to have been goblet-shaped zoophytes allied to the sponges.

PARAMOUNT, a. *păr'ă-mownt* [OF. *par amont*, upper: L. *a monte*, from the mountain]: above all; possessing the highest title or jurisdiction; superior to all others; eminent: N. the highest in rank.—SYN. of 'paramount, a.': chief; principal; superior; pre-eminent; supreme.

PARAMOUR, n. *păr'ă-môr* [F. *par amour*, by way of love—from L. *per*, by; *amōrem*, love]: a sweetheart or lover—used in an ill sense.

PARANA′, *pâ-râ-nâ′:* important river of Brazil, rising in the province of Minas Geraes, about 100 m. n.w. of Rio de Janeiro. It flows w. more than 500 m., through the provinces of Minas Geraes and São Paulo; in the latter it is joined by the Parnahiba, after which its course alters, and it flows s.s.w. to Candelaria, thence w. 200 m. to its confluence with the Paraguay (q.v.), and then, bending s., passes Santa Fé, below which its channel frequently divides and incloses numerous islands. From Santa Fé, it flows s.e., and unites with the Uraguay in forming the Rio de la Plata. Entire length about 2,400 m. It draws a number of considerable tributaries from the province of Paraná (q. v.); and of the others, the chief are the Paraguay, Uruguay, Pardo, Tiete, and Parnahiba. For vessels drawing 16 ft. it is navigable to Corrientes, 600 m. from its mouth.

PARANA′: province in Brazil; bounded n. by the province of São Paulo, e. by the Atlantic, s.e. by Santa Catharina, s. by Rio Grande do Sul, w. by Paraguay and Matto Grosso; 85,415 sq. m. Formerly included in the province of São Paulo, it fully commenced its provincial career 1853. The sea-coast is indented by several bays. A line of mountains runs parallel to the coast about 80 m. inland, and throws out spurs and branches westward. The streams flowing e. from this watershed, though numerous, are inconsiderable; while the rivers flowing w. into the Paraná (q.v.), which forms the w. boundary of the province, are all about or more than 400 m. in length. The principal tributaries are the Paranapanema, Ivay, Piquery, and Yguassu. The climate is unusually healthful; the soil fertile; and agriculture, rearing cattle and swine, and gathering *maté* or Paraguay tea are the chief employments. The cap., Curitiba, has manufactures of coarse woolens, and is connected by railway with Paranagua. The chief and almost the only port, Paranagua (pop., about 6,000), on a bay of the same name, is about 400 m. s.w. of Rio de Janeiro. It exports *maté* to the value of $1,000,000 annually. Pop. of province (1900), 350,000.

PARANAGUA, *pâ-râ-nâ-gwâ:* Brazil, port of the state of Paraná (q.v.), southeast of Curitiba, the capital, and on the southern side of the Gulf of Paranagua, which is navigable for vessels of 300 to 400 tons and is separated from the Atlantic by the Ilha do Mel. Railroads built by French enterprise connect the city with Curitiba and with the harbor at Antonina; and there is regular steamboat connection with Hamburg, because of the German colonists in the state, and the valuable exports of *maté* (averaging 50,000 tons annually), hardwoods, cereals, and sugar. Pop. (estimated, 6,000.

PARANAHYBA, *pâ-râ-nâ-ē′ba,* or PARNAHYBA, *pâr-nâ-ē′bâ:* Brazil, a city and seaport of the state of Piauhy, on the river of the same name, about 10

m. from the coast. It is an unhealthy town, but of importance as the seaport for the region. It ships cattle, hides and cotton. Pop. (estimated), 12,000.

PARANAPHTHALINE, n. *păr'ă-năp'thă-lĭn* [Gr. *para*, beside, near, and Eng. *naphthaline*]: a white solid substance, so called because it resembles and accompanies naphthaline.

PARANEMATA, n. plu. *păr'ă-nē'mă-tă* [Gr. *para*, beside, close to; *nēma*, a thread; *nēmăta*, threads]: in *bot.*, the filaments found along with spores in the fructification of many Algæ.

PARANOIA: one of the types of the insanities. It is characterized by a marked hereditary predisposition, a slow development of persecutory ideas, almost from childhood, with increasing inability to get on in the world, and it usually terminates in a mild type of mental disintegration. Its subjects are the people with mental twists. The disease is one of great importance, and yet the conduct of those affected is often so closely allied to the normal conduct of the environment that it becomes extremely difficult to come to the decision of mental irresponsibility in many of these cases. Although a rare disease, it is particularly important to recognize it, since paranoics are often very dangerous lunatics. The murderer of Garfield was an example. A typical case usually starts wrong in the world, with a mental instability inherited from intensely neurophatic parents. Some type of insanity, or extremism, or pronounced crankiness, or violent temper, is present in the ancestors of most of these cases. Throughout the developing period these children are different from other children; their intellects may be as bright as others; very often they are precocious, but irregularly so, being generally below par; they are apt to be less gay, less expansive; are characteristically introspective, egoistic, frequently very egotistic, and inclined to live within themselves. They think that their parents are less fond of them and show favors to their brothers and sisters. They thus come to be very subjective and live in a realm of fancies and ideas, are notoriously poor observers of fact as entities, and poor scholars in the exact sciences. If they are recognized as defective in these early stages much may be done for them by appropriate training. After reaching years of independence these patients find it difficult to get along with people. They are suspicious and quarrelsome, and soon come to believe that they are objects of special plots and persecutions. The early childhood ideas may be a nucleus for this delusion. This false interpretation of conditions about them becomes more and more fixed in their minds until it is systematized, and everything is woven into the fabric of this belief. Many persist in this state for years. They may be engaged in business; they are often found

among the people of 'artistic temperament.' Here their eccentricities, if coupled with a small modicum of talent, are put up with, and they go along as actors, painters, musicians, writers, inventors, etc., earning perhaps a bare living, or being half supported by friends, while they are laying the foundations of a 'career.' Often the ideas of persecution lead to the development of intense hatred, it may be of an individual as a personal oppressor, or as a hindrance to the cause of truth, of liberty, of freedom, etc. It thus comes about that many paranoiacs are attracted by the doctrines of anarchy, and it is notorious that regicides are prominently represented in this diseased type. Many of these patients suffer from hallucinations; they see faces, hear voices plotting against them, etc. Sometimes these voices seem to accuse them of immoral acts. From ideas of persecution they often graduate into ideas of grandeur. Sometimes the voices appear to tell one of these that he is elected by God to be the savior of his people, and in response to either set of hallucinations he may kill. Mystico-erotic ideas are very frequent in women of this nature, and many are found studying Oriental philosophies and mystic symbolisms from fakirs who hold their hands and teach them breathings and various forms of massage—all of which contribute to their erotic tendencies. One feature is very characteristic in this disease—its one-sidedness. On many of the topics of general conversation the paranoic is rational and often a charming talker; but touch the core of his delusional state and he is transformed. Some part of his brain necessary to bring about mature judgments along certain lines is defective. This defect has never yet been seen by the microscope, but there seems to be little doubt that there is some organic brain-defect. Most of these cases are hopelessly incurable. A few remit, are apparently self-controlled for a time, and then develop. The majority go on to a mild form of dementia, but the breakdown is very slight, although the delusions usually persist and dominate the patient's whole thought and actions. These patients are best confined in sanatoriums. They are nuisances to all, and are better under the strict regime of an institution. Much can be done by early individual training to render these defectives self-supporting. When able to take care of themselves or when wealthy by inheritance, they may be regarded as incorrigible cranks, but still, bearable; but as dependent, they are impossible.

PARATHINE, n. *păr'ăn-thĭn:* a mineral consisting of silicate of alumina and lime; scapolite.

PARANYMPH, n. *păr'ă-nĭmf* [Gr. *para*, beside; *numphē*, a bride]: a male friend of the bridegroom who leads the bride to her marriage; one who gives countenance and support to another.

PARAPECTIC ACID, *păr′ă-pĕk′tĭk* [Gr. *para*, beside, and *pectic*]: an amorphous variety of pectic acid, produced by long-continued boiling, in water, of vegetable jelly.

PARAPEGM, n. *păr′ă-pĕm* [Gr. *parapēg′ma*—from *para*, beside, and *pēgnumi*, I fix]: in *anc. times*, a brazen tablet on which laws, proclamations, etc., were inscribed, and exposed to public view.

PARAPET, n. *păr′ă-pĕt* [F. *parapet*—from It. *parapetto*, a breastwork—from *parare*, to ward off; *petto*, the breast: L. *pectus*]: screen or wall on the edge of a rampart. PARAPETED, a. *păr′ă-pĕt-ĕd*, having a parapet.—A *Parapet* is a wall raised higher than the gutter of a roof, for protection; in military works, for defense against missiles from without (see FORTIFICATION); in domestic

Ornamented Gothic Parapet.

buildings, churches, etc., to prevent accident by falling from the roof, or for purposes of ornament. Parapets are of very ancient date. The Israelites were commanded to build 'a battlement' round their flat roofs. In classic architecture, balustrades were used as parapets. In Gothic architecture, parapets of all kinds are used. In early work they are generally plain, but in later buildings they are pierced and ornamented with tracery, frequently of elaborate design, especially in French Flamboyant work. Shields and little arcades are used as ornaments to parapets; and the battlements of castles are imitated in the parapets of some religious and domestic buildings.

PARAPH, n. *păr′ăf* [F. *parafe*, a flourish: Gr. *para*, beside; *haptō*, I join or connect]: addition to the signature formed by a flourish of the pen, which, during the middle ages, constituted some sort of provision against forgery. Its use is not extinct in diplomacy, and in Spain the P. is still a usual part of a signature.

PARAPHERNALIA, n. plu. *păr′ă-fėr-nā′lĭ-ă* [Gr. *parapherna*, goods in the wife's disposal besides her dower—from *para*, beyond; *phernē*, a dowry or portion; *pherō*, I bear]: term from the Roman law, denoting the clothing, jewels, ornaments, etc., which a wife brings with her at her marriage, besides her dowry; ornaments of dress in general; trappings or finery. In England, according to the common law, the husband may lawfully sell, pawn, or give away the P., and they are seizable

for his debts; but he cannot dispose of them by will, unless he confers on the wife compensating benefits; and she must elect between these two which she will take. The tendency of legislation in the United States has long been toward equality of property rights between husband and wife. In nearly all the states, married women are competent to hold, in absolute individual ownership, property both real and personal, and to control it independently of their husbands.

PARAPHIMOSIS, n. *păr′ă-fī-mō′sĭs* [Gr. *para*, beyond; *phimōsis*, a binding or constriction]: a morbid constriction of the prepuce behind the glans.

PARAPHRASE, n. *păr′ă-frāz* [OF. *paraphrase*—from Gr. *paraphrăsis*, a paraphrase—from *para*, beside, beyond; *phrasis*, a speaking or telling]: loose or free translation of an author's words; verbal expansion; the rendering of a book or some passage of it into other and usually more easily understood language. A P. differs from Metaphrase, or strictly literal translation, in this, that it aims to make the sense of the text clearer by a lucid circumlocution, without actually passing into commentary. The versified passages of Scripture, forming part of the Psalmody of the Scottish Church, are popularly known as 'the Paraphrases.' PARAPHRASE, v. to render a passage plainer than in the original; to make a free translation of; to explain in many words. PAR′APHRASING, imp. PAR′APHRASED, pp. *-frāzd*. PAR′APHRAST, n. *-frăst*, one who paraphrases. PAR′APHRAS′TIC, a. *-frăs′tĭk*, or PAR′APHRAS′TICAL, a. *-tĭ-kăl*, very full in explanation; not verbal or literal. PAR′APHRAS′TICALLY, ad. *-lĭ*.

PARAPLEGIA, n. *păr′ă-plē′jĭ-ă*, or PAR′APLEGY, n. *-plĕj′ĭ* [Gr. *para*, beside; *plēgē*, a stroke]: paralysis affecting the upper or lower half of the body: see PARALYSIS.

PARAPODIA, n. *păr′ă-pŏd′ĭ-ă* [Gr. *para*, beside; *podes*, feet]: the unarticulated lateral locomotive processes, or foot tubercles, of certain of the Annelida.

PARAPOPHYSIS, n. *păr′ă-pŏf′ĭ-sĭs* [Gr. *para*, beyond; *apoph′usis*, an offshoot, a process]: in *anat.*, the process which extends outward, or outward and downward, from the body of the vertebra in fishes; a name given to the transverse process of an ideal typical vertebra.

PARAQUET, n. *păr′ă-kĕt′*, or, in *OE.*, PAR′AQUI′TO, n. *-kē′tō*, PAR′AQUI′TOES, n. pln. *-kē′tōz* [Sp. *periquito*, a small parrot—from *perico*, a parrot]: a little parrot: see PAROQUET.

PARASANG, n. *păr′ă-săng* [Gr. *parasang′gēs;* Pers. *farsang*]: Pers. measure of length; as reported by Herodotus, Suidas, Xenophon, and other ancients, and as estimated by modern travellers, about 30 Greek stadia, = 3¾ m. English. But there were different lengths assigned to the P. among anc. writers, varying from 21 to 60 stadia, i.e., from 13,741 ft. 9 in. to 36,405 ft.

PARÂS'ARA: name of several celebrated personages of ancient India, occurring in the *Mahâbhârata* (q.v.), the *Purân'as* (q.v.), and other works. Of one personage of this name, the *Mahâbhârata* relates that he was son of S'akti, who was son of the patriarch Vasisht'ha. King Kalmâshapâda once meeting with S'akti in a narrow path, in a thicket, required him to stand out of the way. The sage refused; on which the Râja beat him with his whip, and S'akti cursed him to become a Râkshasa, or demon. The Râja, in this transformation, killed and ate S'akti, together with the other sons of Vasisht'ha. S'akti, however, had left his wife, Adris'yantî, pregnant; and she gave birth to Parâs'ara, who was brought up by his grandfather. When he grew up, and was informed of his father's death, he instituted a sacrifice for the destruction of all the Râkshasas, but was dissuaded from its completion by Vasisht'ha and other sages. The same legend is referred to by the *Vishn'u-Purân'a*, where P. is introduced as relating, himself, part of this story, and adding that the saint Pulastya, one of the mind-born sons of Brahmâ, in reward of the clemency that P. had shown even toward such beings as the Râkshasas, bestowed on him the boon of becoming the compiler of the *Purân'as*, and of the *Vishn'u-Purân'a* in particular. 'This tradition,' Prof. Wilson observes, 'is incompatible with the general attribution of all the *Purân'as* to Vyâsa;' but it may perhaps point only to a later recension.—A P., probably different from the above, is the author of a celebrated code of laws, he is often quoted by the commentaries.—A probably third P. is the reputed author of a Tantra (q.v.); and a fourth, the author of an astronomical work

PARASCENIUM, n. *păr'ă-sē'nĭ-ŭm* [Gr. *para*, beside; *skēnē*, a stage]: the place in the Roman theatre corresponding to the green-room of the modern one.

PARASELENE, n. *păr'ă-sĕ-lē'nē* [Gr. *para*, beside; *selēnē*, the moon]: a mock moon or lunar halo.

PARASITA, *păr-a-sī'tâ:* order of insects, now usually distributed between *Anoplura* (true lice), a division of the order *Diptera*, and *Mallophaga* (bird-lice), a degraded division of *Neuroptera*. See LOUSE: PARASITES.

PARASITE, n. *păr'ă-sīt* [F. *parasite*—from L. *parasītŭs*, a parasite: Gr. *para'sītos*, one who eats at another's expense at table, a parasite—from *para*, beside; *sitĕō*, I nourish; *sitos*, wheat, food]: one frequenting the tables of the rich and earning his welcome by flattery; a hanger-on; a fawning flatterer—a common character in Greek comedy: in *bot.*, a climbing-plant which grows upon a tree, and obtains nourishment from its juices (see PARASITES): in *entom.*, an insect living on some animal (see PARASITA: PARASITES). PAR'ASIT'ISM, n. *-sīt'ĭzm*, the manners of a parasite. PAR'ASIT'IC, a. *-sĭt'ĭk*, or PAR'ASIT'ICAL, a. *-ĭ-kăl*, resembling a parasite; fawning; living and drawing nourishment from other plants and animals. PAR'ASIT'ICALLY, ad. *-lĭ*.

PARASITES, ANIMAL AND VEGETABLE: organisms that infest other organisms and live at their expense.

ANIMAL PARASITES.—Of these, some are Entozoa, and some Epizoa (see ENTOZOON: EPIZOON). They belong to different classes, and even to different divisions of the animal kingdom; all, however, invertebrate. Many are of the division *Articulata*, and many of the division *Radiata*. Besides *worms* of various kinds (as tape-worms—including their larval forms, *Echinococcus*, *Cysticercus*, etc.—fluke-worms, round-worms, thread-worms, etc.), there are among parasites not a few crustaceans, as the Lernæans, etc., and not a few insects, as the Louse (q.v.) and the bird-lice (*Mallophaga*). In the true lice (*Anoplura*), the mouth is small and quite suctorial; while in the *Mallophaga*, it is furnished with mandibles and hooked maxillæ. The species of *Anoplura* are found only on man and mammals; those of *Mallophaga* almost exclusively on birds, though one infests the dog. The *Mallophaga* show much greater activity than the *Anoplura*. When a bird dies, the bird-lice congregate near the beak, and seem disquieted, apparently anxious to change their abode. Some of the cirripedes which live in the skin of large marine animals, e.g., whales, can scarcely be regarded as parasitic animals, but rather bear to them a relation such as *Epiphytes* do to parasitical plants, not deriving their nourishment from the animal on which they live. Tape-worms, ascarides, and other intestinal worms, do not directly draw sustenance from the animal in which they live, by extracting its juices; yet they live at its expense, by consuming its food, after the food has undergone, in great part, the process of digestion.

VEGETABLE PARASITES.—These are plants which grow on other plants, and derive sustenance from their juices; the plants which live parasitically on animal tissues being generally called Entophytes (q.v.), though the distinction between these terms is not always preserved. Epiphytes (q.v.) differ from parasitical plants in subsisting not on the juices of the plant which supports them, but on decayed portions of its bark, etc., or drawing all their nourishment from the air. Parasitical plants are numerous and very various; the greater number, however, and the most important, being small fungi, e.g., Rust, Brand, Bunt, Smut, etc., whose minute spores are supposed in some cases to circulate through the juices of the plants which they attack. Concerning some minute fungi, e.g., the Mildews, it is doubted if they are truly parasitical, or if their attacks are not always preceded by some measure of decay. But among parasitic plants are not a few phanerogamous plants, some of which have green leaves; and some are even shrubby, as the Mistletoe, Loranthus, etc.; while the greater number have brown scales instead of leaves, as Dodder, Broom-rape, Lathræa, etc., and the whole of that remarkable order or class of plants *Rhizantheæ* or *Rhizogens*. of which the genus *Rafflesia* is distinguished

above all other plants for the magnitude of its flowers. Some parasitic plants, as the species of Dodder, begin their existence by independent growth from the ground; but when they have found suitable plants to take hold of and prey on, the connection with the ground ceases. Not a few, as Broom-rape and Lathræa, are root-parasites, attaching themselves usually to the roots of trees or shrubs; while some, as the Eyebright (*Euphrasia officinalis*), Yellow Rattle (*Rhinanthus crista galli*), Cow-wheat (*Melampyrum arvense*), etc., are parasitical only occasionally and partially, and are found chiefly on neglected grass-lands. Root-parasites attach themselves usually by means of little tubercles, which bury themselves under the bark.

PARASITES, External: Pediculi, Lice: there are three varieties of lice which select the human subject as a host. These are *P. Capitis, P. Corporis* and *P. Pubis;* or head lice, body lice, and crab lice. The P. Capitis, or head louse, has its habitat only in the hair of the scalp and is found in greatest numbers in the hair of the occipital or back portion of the scalp.

The head louse lives upon the hair, upon which it lays its eggs in rows. Its presence upon the head may often be discovered by the presence of eggs or nits, which are small white globular bodies sticking to the hairs. In children lice in the hairs of the head commonly produce an eruption of the scalp. Adults are not so liable to head lice as children. With them an irritation of the scalp is also caused which takes the form of an eczema or pustular dermatitis and which may eventuate in crusts and scabs at the back of the head, as also obtains in children. A vigorous prolonged scratching of the head, often renewed, together with excoriations and eruptions of the scalp should cause an investigation to be made for these pests. If found they may be readily exterminated, by cutting the hair short, and after washing the head well with warm water and anointing the head over night with equal parts of lard and red mercurial ointment, when the head should be covered by a muslin cap. Lotions of turpentine, coal oil and one part of carbolic acid to fifty of water are also effective agents in the destruction of lice. The mercury should be applied two or three nights in succession and repeated use should also be made of the lotions. Cleanliness and care thereafter are all that is necessary to prevent a recurrence.

P. Corporis, or body louse, may sometimes be found in the hair at the back of the head, but never in the hair of the other parts of the body. It is several times the size of the head louse, and occupies the clothing next to skin, finding hiding places in the seams, where it is to be sought for. Its bite causes small hemorrhagic spots, most common about the neck, back and abdomen. The bite gives rise to considerable irritation, and a wheal-like eruption similar to hives is often occasioned. They may

be destroyed by subjecting the clothing to prolonged boiling in water, or by placing it for several hours in a disinfecting oven at high temperature. Body lice sometimes also find harbor in bedding and this must also be subjected to the prolonged action of high temperature, as well as the body clothing, in order to complete elimination.

P. Pubis, or crab louse, may be found in the short hair of the pubes, and in that of the abdomen, chest, axillæ, beard, whiskers, moustache, eyebrows and eyelashes. In the child this parasite is limited to the eyebrows and eyelashes. In the adult crab lice are found in the greatest number in the hair of the pubes. This flat, crab-like insect, small, and so closely attached to the skin that it appears as a minute speck of dirt, holds on to the epidermis so firmly with his claws that some force is required to dislodge him. The bite of this insect excites irritation which often eventuates in an eruption of prurigo, and may become so severe as to resemble prurigo senilis.

The head louse, as has been stated, lives on the hair and deposits eggs upon the hair shafts. The body louse makes its home on the clothing where it also lays its eggs; while the crab louse lives on the skin and lays its eggs upon the hairs. The head louse, is especially the parasite of children; the body louse, that of old persons, while the crab louse belongs more particularly to adolescence.

The remedy for the crab louse is some form of mercurial ointment which should be diluted one-half with lard and spread over the hairy parts affected. Before applying, a warm bath should be taken, then the parts anointed with equal parts of Ung. hydrarg. nitratis, and lard; and the bath and ointment should be continued for two or three evenings. At the same time there should be a daily change of underclothing, and bed sheets, which should be boiled for an hour in order to guard against recurrence from any insects that may have found lodgement on the clothing of the person or of the bed.

Pulex Irritans, or Flea.—The common flea has two eyes, six long and stout legs, feelers like threads, the oval appendages modified into piercing stylets, and a suctorial proboscis. The derivation of the name is probably from the Anglo-Saxon, *fleohan* to fly, applied to it from is characteristic habit of leaping. It belongs to the genus *Pulex* and the Order *Aphaneptera*. It makes longer leaps in proportion to size than any other animal. There are many species of fleas which are widely distributed and find sustenance upon many animals and birds. The human flea while abundant in Europe is not common in this country where its place is taken by the dog flea—*P. Canis*.

The female flea lays its eggs, which are white and oblong in form, in the dirt in places frequented by domestic animals. The larva, previous to birth, is equipped with a frontal point, which, in hatching, is made use of in break-

ing the shell. Upon emerging from the egg it is without feet, but has two small hooks at the tail by which it attaches itself to the hide of animals from whence it may pass to the human subject.

The bite of the flea causes very considerable irritation and scratching. It occasions a circular, slightly elevated red spot, in the centre of which is a minute hemorrhagic spot marking the entrance of the blood-sucking proboscis. An urticarial or erythematous eruption of the skin, sometimes of considerable severity, is a not uncommon effect of flea bites. The flea is a transient parasite upon man and troubles him but little in cold and temperate zones, while in warm countries it may give him great annoyance because of its very great prevalence in the dust and sand of sheltered places frequented by domestic animals. The remedy is cleanliness and proper care of animals.

Pulex Penetrans.—Chigger, Chigoe, Jigger, or 'earth flea,' is a smaller variety of the species found in the West Indies and South America. It burrows into the toes, particularly under the nails, of persons who traverse the sand with naked feet, and its extraction has been accompanied with serious, and sometimes, fatal results. It is probable, however, that under strict antiseptic precautions the removal of these insects should not be a matter of much moment.

Cimex Lectularius, or Bed-bug.—The bed-bug is about three-sixteenths of an inch in length, is of a reddish-brown color, with a rounded, flattened body, and emits an offensive odor when touched. This peculiar disagreeable odor is due to the secretion of a special gland. Its habitat is in the crevices of the bedstead and in cracks of the floors and walls of the bed-room. In the summer the female deposits her eggs in these retreats where they hatch and attain full size in eleven weeks.

The insect is nocturnal in its habits, and is a blood sucker. It is provided with a long proboscis, which is three-jointed and these joints close together to form the sucker. To some persons the bite of the bed-bug is unirritating, while others suffer in consequence hyperæmia of the skin, and, annoying eruptions of urticaria. These bugs may be exterminated by thorough sulphur fumigation, or by scrubbing and saturating the beds and places they haunt with a strong solution of corrosive sublimate.

Ticks.—These belong to the genus *Ixodes,* of which there are many species. Those which are liable to find a host in man are the wood tick, the dog tick, the sheep tick and the cattle tick. They are capable of maintaining an independent existence upon vegetation. They are reddish-brown colored mites, oblong and flattened in form. When attached to an animal they burrow into the skin with the head, fill themselves with blood, become ovate in shape, and livid red in color. They are but temporary parasites as they fall off after being engorged

with blood. Persons who visit the woods, particularly where there are scrub oaks, while the leaves are on, often find upon themselves one or several of these parasites. In removing the body, which clings to the epidermis tightly by its legs, the head may be separated under the skin, and in consequence, small inflammatory nodules sometimes arise, and, superficial ulcerations. But in general they only cause annoyance, without being poisonous or dangerous.

Acarus Scabiei, Itch Insect, or Itch Mite.—Scabies, or the Itch, is due to the burrowing of the *Acarus scabiei*, or itch mite, in the epidermis. The female is about twice the size of the male, has a pearly white color, and can easily be seen by the naked eye. The males are few in number and are rarely found. The insect burrows through the epidermis, forming a furrow—the *acarian furrow*—which has the appearance of a curved dotted line. It varies in length from the thirtieth to the third of an inch, is crescentic in form and of a white or grayish color. Where the furrow ends is a small vesicular-like elevation—the *acarian eminence*,—containing the female acarus, which may be extracted upon the point of a needle.

The disease is conveyed from one person to another through the media of the ova, which are extruded from the burrows and adhere to what comes in contact with them, which is frequently the naked hand. In from ten days to two weeks after exposure the affection manifests itself by itching of the skin, usually first of the hands and forearms, then of the lower anterior part of the body, and the upper third of the thighs, when it soon becomes general. The face and scalp are seldom affected. In the first stages of the disease the itching is not pronounced until toward evening.

The itch is much more common in Europe than in the United States and Canada where the conditions of living of the masses are much superior to those abroad. It is most prevalent among the impoverished and dirty, but through contact the higher classes of people sometimes become affected. Children are more subject than adults and men than women.

The irritation produced by the mite eventuates in papular, vesicular and pustular eruptions. The itching is intense and the scratching nails cause excoriations, with minute hemorrhages and formation of crusts that similate eruptions of eczema and impetigo. The papular eruption is discrete, in the form of minute papules, but, from the scratching of the tops, a serous exudation occurs which results in concrete reddish crusts, found chiefly on the palmar aspect of the forearm, the abdomen, and the anterior and inner surfaces of the thighs. The papules are a more constant pathognomonic sign of scabies than the vesicles, only failing in about 12 per cent. of cases.

The vesicles vary in size from a pin's head to that of a split pea, or larger, often surrounded by an area of in-

flamed skin. They are discrete and are found on the hands and feet but chiefly upon the backs of the webs of the fingers, on the back and webs of the thumbs and the front of the wrist.

The pustules have the same arrangement, shape, size and location as the vesicles, but they also occur on the nates. The inflammatory patch surrouuding the pustulis is more decided than with the vesicles.

The female acarus itself will determine a case of the itch, but the pustulation and scabbing resulting from the scratching may destroy the burrows, so that it may be very difficult or impossible to find an insect. The form and situation of the skin rashes enables a recognition of scabies almost infallibly. The following constitute a sufficient basis for the diagnosis of scabies without the discovery of the itch mite. Papules upon the inner surface of the forearms, and upon the anterior and interior parts of the thigh; a vesicular eruption of the hands and feet, discrete in form, with a scattered appearance of pustules upon the hands, feet and nates; the flexures of the knees and elbows, are the seats of a confluent vesicular or pustular eruption, together with the wrists, the groin folds and the axillary hollows. With such symptom present, or even the first two of them, there can be little question of the existence of a case of scabies.

The great remedy for scabies is sulphur in the form of an ointment made from ℥ii of precipitated sulphur and ℥i of lard. Before applying the salve the patient should thoroughly soap the skin and then take a warm bath of half an hour's duration. Every part should be soaped and bathed but the head and face. After the bath the skin should be wiped dry with towels and the ointment of sulphur should be well rubbed in over every part of the surface except the head and face. A suit of linen or cotton underclothing should then be put on and worn without change for two days and two nights. Then another bath should be taken, the ointment reapplied and the light underclothing worn for two days and nights more. After another bath, without a sulphur inunction, the cure should be complete, when the soiled clothing can be cast aside and fresh underclothing be put on. Naphthol ℥i to ℥i of lard, also makes an effective ointment for the itch and it is to be employed the same as the sulphur, together with the soap and baths.

Where one member of a family is affected with the itch it is probable that all the others have had exposure to it, and will develop it in time. In order, therefore, to wholly exterminate the disease, and to prevent any recurrence of it, it is necessary that all the household should undergo ablutions and inunctions at the same time.

PARASIT'IC DISEAS'ES. In these diseases, certain morbid conditions are induced by the presence of animals or vegetables which have found a place of subsistence within some tissue or organ, or upon some surface of the body

of man or of other animals. For the forms of animal life giving rise to parasitic diseases, see ASCARIDES: CESTOID: ENTOZOON: EPIZOON: GUINEA-WORM: ITCH-MITE: LOUSE: STRONGYLUS: TAPE-WORM: TRICHINA: etc.

The vegetable parasites are either *fungi* or *bacteria*, and are composed of simple sporules, germs, or cells, or of cells arranged in rows or groups, so minute as to require the microscope for their recognition. Most of the infectious diseases (diptheria, typhoid fever, pneumonia, tuberculosis, etc.) are caused by the presence of bacteria; others, such as malaria, relapsing fever, and syphilis, are due to the presence of very minute single-celled animal organisms (protozoa). In a number of the infectious diseases (scarlet fever, measles, yellow fever, smallpox) the parasite causing the affection has not been positively identified, but from their resemblance to other known germ diseases it is assumed that they have a similar causation. There is undoubted evidence that some of these parasitic diseases may be transmitted by contagion from horses, oxen, and other animals to man; while conversely animals may sometimes contract disease by infection from man.

PARASOL, n. *păr'ă-sŏl or păr-ă-sŏl* [F. and Sp. *parasol*—from It. *parasole*, a parasol—from It. *parare*, F. *parer*, to ward off, and L. *sol;* It. *sole*, the sun]: a small umbrella carried by ladies as a shade against the sun's rays. PAR'ASOLETTE', n. *-ĕt*, a small parasol. The parasol was used among the ancients, not for the purpose so much of preservation from the rays of the sun as in religious ceremonies and processions. In certain festivals the young females who celebrated them bore, among other sacred instruments, the parasol: it was, in fact, one of the most ancient marks of dignity that we find indicated either by relics of art or by authors. In process of time, when the Romans began to lay aside the simple habits of their forefathers, the parasol, by a natural transition, began to be used for the purpose to which it is still applied. The matrons particularly used to be followed by slaves, whose office was to protect the delicacy of their charms by intercepting the solar heat by the agreeable shade of the parasols. They were constructed of wands or twigs, disposed in such a manner as to admit of their being put up or down, in much the same way as those used at the present day. See UMBRELLA.

PARASPERMATIA, n. plu. *păr'ă-spĕr-mā'shĭ-ă* [Gr. *para*, beside; *sperma*, seed]: in *bot.*, bodies resembling spores, found in some Algæ.

PARASTICHY, n. *păr-ăs'tĭ-kē* [Gr. *para*, beside; *stichos*, a row]: in *bot.*, a secondary spiral, such as is visible in cones, owing to the close apposition of the scales, but not corresponding to the order of their development.

PARATAXIS, n. *păr'ă-tăks'ĭs* [Gr. *para*, beside; *taxis*, a putting in order]: a loose arrangement of propositions as they arise in the mind; in *gram.*, opposed to syntax.

PARATHESIS, n. *pă-răth'ĕ-sĭs* [Gr. *para*, beside; *thĕsis*, a placing]: apposition, or the placing of two or more nouns in the same case; a parenthetical notice; in *printing* or *writing*, that which is placed within brackets. PARATHETIC, a. *păr'ă-thĕt'ik* [Gr. *para*, beside; *thetĭkos*, fit for placing]: placed in apposition, as two or more nouns, singly or in a compound form, as *steam-engine*.

PARATHYROID GLANDS: small glandular bodies, usually two in number, but sometimes three or four, lying posterior to, or sometimes below, the thyroid gland. They are independent of the thyroid gland in structure as well as in function, but what their function is has not been determined. It has been observed that tetany follows their removal, and they have been found hypertrophical in cases of acromegaly, but it is not known what the significance of these changes is.

PARATONNERRE, n. *păr'ă-tŏn-nār'* [F. *paratonnerre* —from *parer*, to ward off; *tonnerre*, thunder]: a lightning-conductor.

PARATHOID FEVER: a disease resembling in general typhoid fever, but differing from it in certain particulars, and as a rule much milder in its symptoms. The disease begins gradually, much like typhoid, with headache, loss of appetite, and malaise. The fever continues three or four weeks and subsides gradually, as it rose, but without the characteristic zigzag curve of the temperature rise and fall in typhoid fever. Recovery takes place as a rule without any serious complications or sequels. In former times this disease was undoubtedly mistaken for typhoid fever, which it so much resembles.

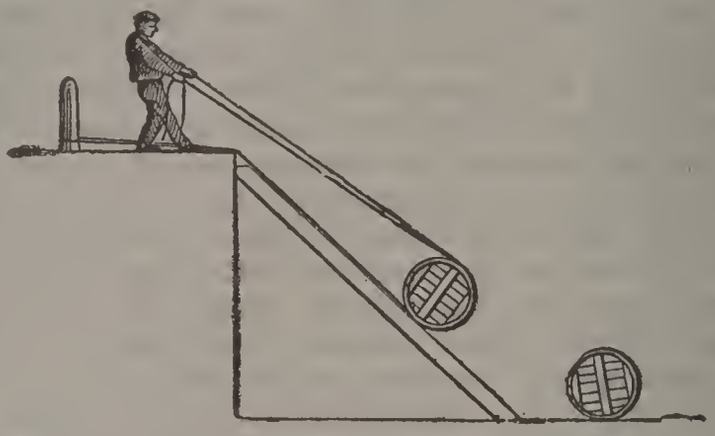
PARAVANT, n. *păr'â-vânt*, or PARAVAUNT, n. *păr'â-vânt* or *-vawnt* [OF. *paravant*, in front—from *par*, by, through; *avant*, before—from L. *ab*, from; *ante*, before]: in *OE.*, in front; publicly; beforehand.

PARBOIL, v. *pâr'boyl* [OF. *parbouillir*, to cook thoroughly, to parboil—from *par*, through; *bouillir*, to boil]: to boil in part; to half-boil. PAR'BOILING, imp. PAR'BOILED, pp. *-boyld*, boiled moderately or in part. *Note.* —PARBOIL formerly meant to 'boil thoroughly,' and acquired the meaning 'to boil in part' from the mistaken notion of its derivation from Eng., *part* and *boil*.

PARBREAK, v. *pâr'brāk* [F. *par*, through, and Eng. *break:* Scot: *perbraik*, to shatter]: in OE., to vomit.

PARBUCKLE, n. *pâr'bŭk-l* [F. *par*, by or through, and Eng. *buckle*]: mode of drawing up or lowering down an inclined plane any cylindrical object, as a barrel or a heavy gun, without aid of crane or tackle. It consists in passing a stout rope round a post or some suitable object at the top of the incline, and then doubling the ends under and over the object to be moved. This con-

verts the cask or gun into a pulley in its own behalf, and limits the pressure at each end of the rope to one-fourth the weight of the object moved, as felt on the incline. By hauling in the ends equally, the cask ascends; or *vice versa*. PARBUCKLE, v. to hoist, lower, or roll by means of ropes formed into a parbuckle. PAR'BUCKLING, imp. *-bŭk-lĭng*. PAR'BUCKLED, pp. *-bŭk-ld*.



Parbuckle.

PARCÆ, n. plu. *pâr'sē* [L. *pars*, a part]: in *anc. Roman myth.*, the three goddesses of Fate or Destiny, who assigned to every one his 'part' or lot. The Greek name, *Moiræ*, has the same meaning [from *meros*, a share]. They are mentioned only once by Homer, who in every other instance speaks of Fate (Moira) in the singular, and whose Fate was not a deity, but a mere personification, the destinies of men being made by him to depend on the will of the gods; while, according to the later Greeks and the Romans, the gods themselves were subject to the control of the P. or Moiræ. Hesiod, however, who is almost contemporary with Homer, speaks of three Fates, whom he calls daughters of Night—Clotho, the spinner of the thread of life; Lachesis, who determines the lot of life; and Atropos, the inevitable. They were represented usually as young women of serious aspect; Clotho with a spindle, Lachesis pointing with a staff to the horoscope of man on a globe, and Atropos with a pair of scales, or sun-dial, or an instrument to cut the thread of life. In the oldest representations of them, however, they appear as matrons, with staffs or sceptres. They had places consecrated to them throughout all Greece, at Corinth, Sparta, Thebes, Olympia, etc.

PARCEL, n. *pâr'sĕl* [F. *parcelle*, a little part, a parcel—from mid. L. and It. *particella*, any little part or particle—from L. *partic'ula*, a small part]: portion of anything taken or selected; a quantity; a part of a whole; a small package of goods; a number of persons, in contempt: in *law*, technical word for the article in a conveyance describing the lands, etc., conveyed: V. to put up or divide into portions or parts. PAR'CELLING, or PAR'CELING, imp.: N. among *seamen*, the wrapping of ropes, etc., with pieces of tarred canvas to protect them from friction. PAR'CELLED, or PAR'CELED, pp. *-sĕld*. PARCEL-BOOK, a merchant's register-book of the dispatch of parcels.

PARCEL-BEARDED, partially bearded. PARCEL-BLIND, partially blind. PARCEL-GILT, partially gilded, usually on the inside. PARCEL-VAN, a light conveyance for the delivery of parcels.

PARCENARY, n. *pâr'sĕn-ă-rĭ* [Norm. F. *parcenier;* OF. *parcener*, to take part with—from L. *partīrī*, to part, to divide]: joint tenancy by descent. PAR'CENER, n. *-ẽr*, a co-heir; OE. spelling of PARTNER, which see: see also COPARCENARY.

PARCH, v. *pârch* [Bav. *pfärzen*, to fry; *färzen*, to toast bread: L. *perares'co*, I grow very dry: comp. Ir. *barg*, burning, red-hot: the word is probably onomatopoetic]: to burn the surface of a thing; to scorch; to dry to excess; to shrivel with heat. PARCH'ING, imp.: ADJ. having the quality of burning or drying to excess. PARCHED, pp. *pârcht:* ADJ. dried to excess. PARCHEDLY, ad. *pârch'ĕd-lĭ.* PARCH'EDNESS, n. *-nĕs*, the state of being scorched by heat or dried to excess. PARCH'INGLY, ad. *-lĭ.*

PARCHIM, *pârch'ĭm:* town of the grand duchy of Mecklenburg-Schwerin; on the Elde, here divided into two arms, 23 m. s.e. of Schwerin. It is very old, irregularly built, surrounded by beautiful gardens, and has a gymnasium and two churches. The people are employed in agriculture, in the manufacture of tobacco, cloth, leather, and brandy, and in weaving. Pop. (1880) 9,063; (1890) 9,960.

PARCHMENT, n. *pârch'mĕnt* [F. *parchemin*, parchment—from L. and It. *pergame'na*, parchment—from *Pergamos*, in Asia Minor]: one of the oldest inventions of writing materials, known at least as early as B.C. 500. Herodotus speaks of books written on skins in his time. Pliny, without good grounds, places the invention as late as B.C. 196, stating that P. was made at Pergamos (hence the name *Pergamena*, corrupted into Eng. parchment) in the reign of Eumenius II., in consequence of Ptolemy of Egypt having prohibited the exportation of papyrus. Possibly the Pergamian invention was an improvement in the preparation of skins, which had certainly been used for this purpose centuries before. The manufacture rose to great importance in Rome about a century B.C., and soon became the chief material for writing on; and its use spread all over Europe, and retained pre-eminence until the invention of paper from rags: this, from the great durability of P., proved fortunate for literature.

There are several kinds of P., prepared from skins of different animals, according to the uses intended. The ordinary writing P. is made from skins of the sheep and of the she-goat; the finer kind, *vellum*, is made from those of very young calves, kids, and lambs; the thick common kinds, for drums, tambourines, battledores, etc., from those of old he-goats and she-goats, and in n. Europe from wolves; and a peculiar kind is made from asses' skins, the surface of which is enamelled. It is used for tablets, as black-lead writing can be readily

removed from it by moisture. The method of making P. is at first the same as in dressing skins for leather. The skins are limed in the lime-pit until the hair is easily removed. They are then stretched tightly and equally, and the flesh side is dressed as in currying, until a perfectly smooth surface is obtained. It is next *ground* by rubbing over it a flat piece of pumice-stone, previously dressing the flesh side only with powdered chalk, and slaked lime sprinkled over it. It is next allowed to dry, still tightly stretched on the frame. The drying process is important, and must be rather slowly carried on, for which purpose it must be in the shade. Sometimes these operations have to be repeated several times, to insure an excellent quality, and much depends on the skill with which the pumice-stone is used, also on the fineness of the pumice itself. When quite dried, the lime and chalk are removed by rubbing with a soft lambskin with the wool on.—PARCHMENT-PAPER, or VEGETABLE PARCHMENT, substance made known by W. E. Gaine 1854, and again by the Rev. J. Barlow 1857. It resembles animal parchment so closely, that it is not easy to distinguish the difference. It is made from the water-leaf, or unsized paper, by immersing it for only a few seconds in a bath of oil of vitriol, diluted with one-half its volume of water. The exactness of this dilution is of the greatest importance to the success of the results. The dilute acid must not be used immediately after mixing, but must be suffered to cool to the ordinary temperature; without attention to these apparently trivial points, the operator will not succeed. The alteration in the paper is very remarkable. No chemical change is effected, nor is the weight increased; but it appears that a molecular change takes place, and the material is placed in a transition state between the cellulose of woody fibre and dextrine. Vegetable parchment is in some respects preferable to the old kind, for insects attack it less, and it can be made so thin as to be used for tracing-paper, and bears wet without injury.

PARCIMONY: obsolete form of PARSIMONY (q.v.).

PARD, n. *pârd* [L. *pardus;* Gr. *pardos;* OE. *pard*, a panther]: a leopard; a panther; in *poetry*, any spotted beast. PARDAL, n. *pâr′dăl*, for PARD in OE.

PARDON, n. *pâr′dn* [F. *pardon*, pardon—from *pardonner*, to forgive—from mid. L. *perdonārĕ*, to pardon, to remit a debt—from L. *per*, through; *dono*, I give: It. *perdona*, pardon]: forgiveness; remission of a penalty or punishment; a warrant of forgiveness or of exemption from punishment: V. to grant forgiveness of; to remit; to excuse; to forgive; to absolve; to acquit. PAR′DONING, imp. PAR′DONED, pp. *-dnd.* PAR′DONER, n. *-ĕr*, one who pardons; one who dealt in papal indulgences. PAR′DONABLE, a. *-ă-bl*, that may be pardoned; venial; excusable. PAR′DONABLY, ad. *-ă-blĭ.* PAR′DONABLENESS, n. *-bl-nĕs*, the quality of being pardonable. PARDON ME, forgive me; a word denoting a civil denial or a

slight apology. BEG PARDON, a slight apology for non-attention, non-observation, an unintentional though trivial fault, and the like.

PAR'DON, in Law: act of the executive authority of a state or commonwealth, whereby an individual is exempted from the penalty attaching by law to an offense that he has committed. P. is, by its nature, a derogation of the law; and if the power of pardoning is exercised frequently, that is proof either that the law itself works injustice and needs amendment, or that the power granting the pardon is not in sympathy with the intent of the lawgiver. Under the federal constitution and the constitutions of the several states of the American Union, the pardoning power is lodged in the executive of the United States and of the states, and it extends to all offenses against the laws, except in cases of impeachment. In some of the states, the pardoning power does not vest absolutely in the executive: either the legislature must concur, or a special board of P. must have first approved the petition for the exercise of the pardoning power.

To be valid, a P. must express distinctly the crime intended to be forgiven; and it exempts the culprit from punishment for that particular offense, and no other: thus, were a man to be pardoned for an assault and battery, the act of P. would not cover the crime of manslaughter or murder, should the injured party die of his injuries. P. restores to the criminal all his rights as they were before the offense and conviction; but to this rule there are exceptions—first, it does not restore civic capacity; second, if the status of another party has been changed by the conviction of the offender, that change is not undone by the P.—for example, if criminal conviction of a man works divorce of his wife, she does not become his wife again through the pardon.

PARDUBITZ, *pâr'dô-bĭts:* town of Austria, Bohemia, 61 m. e. of Prague. It has copper, iron, and paper manufactures. P. was the headquarters of the king of Prussia 1866, June 7. Pop. (1880) 10,010.

PARE, v. *pār* [F. *parer*, to deck, to trim, to peel an apple; It. *parare*, to dress, to trim out—from L. *parārĕ*, to get ready]: to slice or shave off from the surface; to diminish by little and little; to trim. PA'RING, imp.: N. that which is pared off. PARED, pp. *pārd.* PARER, n. *pā'rĕr*, he or that which pares. PA'RINGS, n. plu. *-rĭngz*, unimportant matters; trifles; small savings in a bad sense, as in *cheese-parings.*

PARÉ, *pâr're*, F. *pâ-rā'*, AMBROISE: renowned French surgeon, father of modern surgery: b. about the beginning of the 16th c., at Laval, dept. of Mayenne, France; d. 1590, Dec. 22. His father, who was a trunk-maker, was unable to afford him a literary education, and apprenticed him to a barber and surgeon. P., after a brief term of service, acquired such fondness for surgery and anatomy, that he went to Paris to prosecute his studies

His means were very limited; he could afford to obtain instruction from only the more obscure teachers; few books were within his reach; yet by perseverance and rare discrimination, combined with the valuable practice in the Hôtel de Dieu of Paris, he laid a foundation for future eminence. In 1536 P. was received as a master barber-surgeon, and joined the army of Marshal René de Monte-Jean, which was starting for Italy. During this campaign he improved the mode of treatment of gunshot wounds, previously most barbarous—namely, cauterization with boiling oil. His reputation as well as his skill were heightened during this campaign. In 1539 he returned to Paris, and was received with distinction by the Royal College of Chirurgery, of which he was subsequently appointed president. In a later campaign, under Antoine de Bourbon, Duke of Vendôme, he cured François, second Duke of Guise, of the wound which conferred on him the sobriquet *Balafré;* and substituted ligature of the arteries for cauterization with a red-hot iron after amputation—being the first to show that this method could safely be applied. 1552, Sep., he was appointed surgeon to King Henry II., and in the following year was taken prisoner at Hesdin; but was released, in consideration of his having cured Col. de Vaudeville, after rejecting the brilliant offers made him by the Duke of Savoy to remain in his service. Returning to Paris, honors were showered upon him; and though he was ignorant of Latin, the *conditio sine quâ non* of a liberal education at that time, no hesitation was shown in conferring upon him learned titles and degrees. He attended Francis II. on his death-bed, and held the office of king's surgeon to his successors, Charles IX. and Henry III. The former of these monarchs, whose life had been gravely threatened by an injury inflicted by his physician Portail, and who had been preserved by P., saved him during the massacre of St. Bartholomew by locking him in his own chamber. During the latter part of P.'s life, he suffered from the envy of his professional brethren, who showered obloquy upon him for having 'dishonored science by writing in the vulgar tongue.' P. died at Paris. His writings have exercised great influence on the practice of surgery in various countries, and are held of high authority on gunshot wounds. The first complete edition appeared at Lyon 1562; and the last, ed. by Malgaigne, at Paris (1840–1, 3 vols.). Besides these are 8 Latin editions, and more than 15 translations into English, Dutch, German, etc.

PAREGMENON, n. *pâ-rĕg′mĕ-nŏn* [Gr. *paragō*, I lead, I derive, as one word from another]: in *rhet.*, the employment of several words having a common origin in the same sentence.

PAREGORIC, n. *păr'ĕ-gŏr'ĭk*, or PAREGORIC ELIXIR [Gr. *paregorikos*, capable of affording relief—from *agoreuō*, I address]: *Camphorated Tincture of Opium* consisting of an alcoholic solution of opium, benzoic acid, camphor, and oil of anise. PAREGORIC, a. soothing; mitigating.

PAREIRA ROOT, *pa-rī'ra rôt* (called sometimes *Pareira Brava*): pharmaceutic substance, generally regarded as the dried root of *Cissampelos Pereira* (see CISSAMPELOS), but coming from a different plant of the same order of *Menispermaceæ*—viz., either *Chondrodendrum tomentosum*, or *Botryopsis platophylla*.

PAREJA, JUAN DE, *hô-ân' dā pa-rā'hâ*, familiarly called 'El Esclavo:' Spanish painter: b. Seville 1606; d. Madrid 1670. He had, while a mere boy, been purchased by the painter Velasquez as a slave and as he was constantly employed in the painting-room of Velasquez, he became inspired with a passion for painting and secretly copied the works of his master. Velasquez subsequently took him to be his pupil. His *Calling of Saint Matthew* (1661) is in the Prado gallery at Madrid, and in the Hermitage at St. Petersburg is a very beautiful portrait by him. In the chapel of the Recollects at Madrid is his *Saint John the Evangelist, Orontius and the Madonna;* and the *Baptism of Christ* is in the Santa Trinidad at Toledo.

PARELCON, n. *pa-rĕl'kŏn* [Gr. *parelkō*, I draw out; *para*, along; *elkō*, I draw]: in *gram.*, the addition of a syllable or particle to the end of a pronoun, verb, or adverb.

PARELLA, *pâ-rĕl'lâ* (Fr. *parelle* or *perelle*): name often given to some of those crustaceous lichens which are used to produce Archil, Cudbear, and Litmus; though the name belongs strictly to one species, *Lecanora parella*, resembling the Cudbear Lichen, but with somewhat plaited warty crust, and with shields (*apothecia*) having a concave disk of the same color as the thick tumid even border. Like the Cudbear Lichen it grows on rocks in mountainous districts in Great Britain and on the continent of Europe.

PAREMBOLE, n. *pă-rĕm'bŏ-lē*, [Gr. *paremʹbolē*, a throwing in beside—from *para*, beside; *en*, in, and *ballō*, I throw]: something explanatory inserted in a sentence more closely connected with the context than a parenthesis.

PARENCHYMA, n. *pă-rĕng'kĭ-mă*, or *păr'ĕng-kī'mă* [Gr. *parenʹchūma*, a discharge of humors from the lungs, substance of organs—from *para*, beside, through; *engʹcheō*, I pour in, I infuse; *chuma*, juice (see CHEMISTRY)]: in *bot.*, the cellular tissue or pith of plants; tissue composed of thin-walled cubical cells. PARENCHYMATOUS, a. *păr-ĕng-kĭm'ă-tŭs*, or PARENCHYMOUS, a. *pă-rĕng'kĭmŭs*, pertaining to or resembling parenchyma; spongy; soft; pithy. See CELLULAR TISSUE.

PARENETIC, a. *păr'ĕ-nĕt'ĭk*, or PAR'ENET'ICAL, a. *-ĭ-kăl* [Gr. *parainet'ikos*—from *parai'nĕsis*, exhortation]: persuasive; encouraging.

PARENT, n. *păr'ĕnt* or *pā'rĕnt* [F. *parent*—from L. *paren'tem*, a father or mother: It. *parente*]: a father or mother; cause; source. PA'RENTLESS, a. *-lĕs*, deprived of parents. PARENTAGE, n. *pā'rĕnt-āj* [F.]: extraction; birth. PARENTAL, a. *pă-rĕnt'ăl*, pertaining to or becoming a parent; affectionate. PARENT'ALLY, ad. *-lĭ*. PARENT'ICIDE, n. *-ĭ-sīd* [L. *cædo*, I cut or kill]: one who kills a parent; the crime.

PAR'ENT AND CHILD, in Law: legal relation incident to the relation between Husband and Wife (q.v.), and flowing out of the contract of marriage. The legal is to be distinguished from the natural relation, for two persons may be by the law of nature parent and child, while they are not legally or legitimately so. Hence a radical distinction exists between natural or illegitimate and legitimate children, and their legal rights as against their parents respectively are very different. Legitimate children are the children of two parents recognized as married according to the laws of the country in which they are domiciled at the time of the birth; and according to the law of England, if a child is illegitimate at the time of the birth, nothing that can happen afterward will ever make it legitimate, the maxim being 'once illegitimate, always illegitimate.' In the United States, there is wide diversity between the statutes of the several commonwealths with regard to legitimacy. Subsequent marriage of the parents legitimatizes the child in Ill., Ind., Mich., Miss., and Mo.; in O., a bastard is legitimatized by mere acknowledgment on the part of the putative parents. In Ala., Conn., Ill., Ind., Ky., Me., Mass., Mich., N. C., O., R. I., Tenn., Vt., and Va., a bastard inherits from his mother, under certain restrictions imposed by statutes.

1. *As to Legitimate Children.*—According to the law of England, there is no duty whatever on the parent to support the child, consequently no mode of enforcing such support. The law of nature was probably considered sufficient to supply the motives which urge a parent to support the child. This defect was to some extent remedied when what is called the Poor-Law was created by statute in the reign of Elizabeth, by which law parents and children are compellable to a certain small extent, but only when having the pecuniary means to do so, to support each other, or rather to help the parish authorities to do so. In the United States the law requires the father to support his infant children if he be able, even though they have property of their own. But should he neglect his duty, and should the child be found in a destitute state, and be taken up, fed, clothed, and saved from starvation by a stranger, such stranger cannot, in the United States any more than in England, sue the parent for the expense, or any part of it, how-

ever necessary to the child's existence. To make the father liable for maintenance, there must in all cases be made out against him some contract, express or implied, by which he undertook to pay for such expense. But when the child is living in the father's house, it is always held by a jury or court, particularly in the United States, that slight evidence is sufficient to prove at least an implied promise by the father to pay for such expenses—e.g., if the child orders clothes or provisions, and the father sees these in use or in process of consumption, it will be taken that he assented to and adopted the contract, and so he will be bound to pay for them. So, if a parent put a child to a boarding-school, very slight evidence of a contract will be held sufficient to hold him liable. When it is said that a parent is not compellable by the English common law to maintain his child, it must at the same time be observed that if a child is put under the care and dominion of an adult person, and the latter wilfully neglects or refuses to feed or maintain such child, whereby the child dies or is injured, such adult will incur the penalties of misdemeanor; but this offense does not result from the relationship of parent and child, and may arise between an adult and child in any circumstances, as where a child is an apprentice or servant. In England, when a person becomes chargeable to the parish as a pauper, the lawful authorities can obtain an order from the justice of the peace, commanding the parent (or the child) of such pauper to pay the expense of the pauper's maintenance. In the United States, as above said, the parent is compelled to provide for the support of his children while they are minors, or under the father's authority; but this obligation ceases at the majority of the child, unless the child becomes chargeable to the public as a pauper; and generally the statutes require children to maintain their parents who are in want. In both England and the United States, if the parent die intestate, both the real and personal property will go to the children, subject to the widow's dower; but the parent is entitled, if he choose, to disinherit the children, and give away his property to strangers, provided he execute his will in due form, which he may competently do on death-bed if in possession of his faculties.

Another important point of law, affecting the mutual relation of parent and child, is the right of the parent to the custody of the child. At common law it is the father who has the right to the custody of the child until majority at least, as against third parties; and no court will deprive him of such custody except on strong grounds. Whenever the child is entitled to property, the court so far controls his parental right that, if the father is shown to act with cruelty, or to be guilty of immorality, a guardian will be appointed. A court of common law also has often to decide in cases of children brought before it by *habeas corpus*, when parties have

had the custody against the father's will. In such cases, if the child is under 14 years, called the age of nurture, and the father is not shown to be cruel or immoral, the court will order the child to be delivered up to him; but if the child is above 14, or, as some say, above 16, the court will allow the child to choose where to go. So the father is entitled by his will to appoint a guardian to his children while they are under age. In England, the mother had, at common law, no right as against the father to the custody of the children, however young; but under a statute of 36 and 37 Vict. c. 12, she is entitled to the custody of the child while under 16 years of age, or rather she is entitled to apply to the court of chancery for leave to keep the children while under that age; and access may be allowed to the father or guardian. If the parents separate by agreement, no stipulation will be enforced prejudicial to the child. In case of divorce or judicial separation, the court of divorce has power to direct who is to have the custody of the children. In the United States, the custody of the children of divorced or legally separated parents is determined by the court, the general principle being to consult the welfare of the child rather than any supposed rights of the parents, and to commit the children to one or other parent, or even to a third person. If the father dies without leaving any testamentary guardian, the mother becomes guardian of the person and estate of the child till it is 14 years old, when it may choose a guardian; but in Penn., the orphans' court appoints the guardian until the infant shall attain the 14th year.

2. *Illegitimate Children.* In strictness of law, an illegitimate child has no father—hence, in case of the death of the father without making a will, the law will not treat such child as entitled to a share of the father's property. With regard to the mother, she is not bound to maintain her child, according to the common law in England; but the Poor-Law Acts have made an important qualification of her rights and duties. The father is not bound even by the Poor-Laws to maintain the child, and the parish officers cannot now institute any proceeding whatever against him for this purpose; but the mother can, to a certain extent, enforce against him a contribution toward the child's maintenance and education, or the parish officers may do so. It is entirely discretionary on the mother to take any proceeding against the father, but if she chooses she can do so; and the first step is to go before a justice of the peace, and obtain a summons of affiliation. On proof that he is the father of the child, the magistrate may make an order against the father to pay the expenses of lying-in, and a weekly sum not exceeding five shillings till the child attains the age of 16. The utmost, therefore, that the father can be made to contribute toward the child's maintenance is only a portion of the whole, the chief burden being thrown on the mother, who is assumed to be the more blameable party. Though

she is not bound by the common law to maintain her child, yet the Poor-Laws make her liable to maintain the child till it attains 16; and not only is she bound, but also any man who marries her is by statute bound to support all her illegitimate (also legitimate) children till they attain the age of 16. The result is, that illegitimate children under 16 are better provided for by the present state of the law in England than legitimate children, inasmuch as the mother is positively bound to support her illegitimate child, and only to a less extent her legitimate child. As regards the custody of illegitimate children, the mother is the party exclusively entitled, for the father is not deemed, in point of law, to be related to such child. In the United States, generally, the mother of a bastard child has right to the custody and control of such child, even as against its father; but after her death the court may deliver the child to the father rather than to the maternal grandfather: the father of a bastard child can be compelled to contribute to its support when it becomes a charge to the county or town, owing to the mother's inability to support it.

In Scotland, the law of parent and child differs materially from the law of England. In Scotland, a bastard is legitimatized by the marriage of his parents. So, too, Scotch law differs from English in that it imposes the obligation of mutual support upon parents and children (legitimate). The legal liability as between parent and child is qualified in this way by the common law, that if a person has both a father and a child living and able to support him, then the child is primarily liable, and next the grandchild, after whom comes the father, and next the grandfather. Not only are parent and child liable to support each other while the party supporting is alive, but if he die, his executors also are liable; and this liability is not limited by the age of majority, but continues during the life of the party supported. In Scotland, a father cannot disinherit his child—at least so far as concerns his movable property; and cannot deprive the children of one-third, or, if their mother is dead, of one-half of such property. In many other respects, the ancient common law of Scotland is more in harmony with the spirit of modern legislation than is the common law of England.—See PATRIA POTESTAS.

PARENTHESIS, n. *pă-rĕn′thĕ-sĭs*, PAREN′THESES, n. plu. *-thĕ-sēz* [Gr. *paren′thĕsis*, insertion—from *para*, beside; *en*, in; *thĕsis*, a putting or placing]: clause, or part of a sentence or argument, not absolutely essential to the sense, and not necessarily grammatically connected with the sentence, but generally serving either for explanation or confirmation, sometimes chiefly for rhetorical effect. A parenthesis is regularly included between the upright curves ( ), though the *dash* (—), or even the comma, at the beginning and end of the parenthesis is often used. PARENTHETIC, a. *păr′ĕn-thĕt′ĭk*, or PAR′ENTHET′ICAL, a. *-ĭ-kăl*, expressed in a parenthesis; pert. to or using parentheses. PAR′ENTHET′ICALLY, ad. *-lĭ*.

PARE'PA-RO'SA, EUPHROSYNE: see ROSA.

PARESIS, n. *păr'ĕ-sĭs* [Gr. *paresis*, fr. *para*, beside; *hiemi*, let go]: paralysis, affecting muscular motion, but not sensation. *General P.* is the progressive paralysis of insanity.

PARGET, n. *pâr'jĕt* [mid. L. *spargĭtārĕ*, to sprinkle frequently; *spargere*, to sprinkle: others again, L. *paries* or *par'ĭĕtem*, a wall]: rough plaster laid on roofs; the coarse plaster composed of lime, hair, and cow-dung, used to line chimney-flues: V. to cover with the rough plaster parget. PAR'GETING or PAR'GETTING, imp. PAR'GETED or PAR GETTED, pp.

PARHELION, n. *pâr-hē'lĭ-ŏn*, PARHE'LIA, n. plu. *-lĭ-ă* [Gr. *para*, beside; *hēlĭŏs*, the sun]: a mock sun appearing as a bright image near the real sun: see HALO—PARHELION—CORONA.

PARIAH, n. *pâ'rĭ-â* [Skr. *parāyā*, strange, foreign]: one of the lowest class of people in certain parts of India, without caste; an outcast; one contemned and despised by society. Pariah denotes the lowest class of the population of India—a caste by itself, which, not belonging to any of the castes of the Brahminical system, is shunned even by the lowest Hindu professing the Brahminical religion, as touching a Paria would render him impure. The P. seem to belong to a negro race, as appears from their short woolly hair, flat nose, and thick lips; they are of short stature; their propensities are of the coarsest kind. In some parts of India, they have sunk so low that according to some writers, it is scarcely possible to imagine a more degraded set of beings. PARIAH DOGS, native dogs in the East without masters or homes (see CUR). *Note.*—The Rev. P. Percival, in his *Land of the Veda*, says that *pariar* or *pariah* is from Tamil *pari*, a tom-tom or drum, pariahs being the class employed as tom-tom beaters.

PARIAL, n. *pă-rī'ăl* [contr. of *pair royal*]: three of a sort in certain games of cards.

PARIAN, a. *pā'rĭ-ăn:* pertaining to or found in the island of *Paros*, a place famed for its marble: N. fine kind of porcelain for statuettes.

PA'RIAN CHRON'ICLE: see ARUNDEL MARBLES.

PA'RIDÆ AND PA'RUS: see TIT.

PARIDIGITATE, a. *păr-ĭ-dĭj'ĭ-tāt* [L. *par*, genit. *paris*, equal; Eng. *digitate*]: having an even number of fingers and toes.

PARIES, n. *păr'ĭ-ēz*, PARIETES, n. plu. *pă-rī'ĕ-tēz* [L. a wall]: in *anat.* and *bot.*, the inside walls of any cavity, as the parietes of the cranium, the parietes of a capsule, used generally in the plural.

PARIETAL, a. *pă-rī′ĕ-tăl* [F. *pariétal*—from L. *parietalis*—from *paries* or *parietem*, a wall: It. *parietale*]: pertaining to walls; in *anat.*, constituting the sides or walls—applied to a large flat bone on each side of the head (see SKULL): in *bot.*, growing from the side or wall of another organ—applied to placentas on the wall of the ovary. PARIETARY, n. *pă-rī′ĕ-tă-rĭ*, a plant, the common pellitory of old walls. PARIETES, n. plu. *pă-rī′ĕ-tēz*, the inclosing walls of any cavity.

PARIETIN, n. *păr-ī′ĕ-tĭn:* a yellow coloring matter, found in the plant *Pamētĭă parĭĕtīna:* see also CHRYSOPHANIC ACID.

PARIETO-, prefix *pa-rī-ĕt-o-* [L. *paries*, genit. *parietis;* *o* connective]: a wall.

PARIETOSPLANCHNIC, a. *păr-ī′ĕt-ō-splăngk′nĭk* [L. *paries*, a wall, *parietis*, of a wall; Gr. *splangchna*, bowels or entrails]: denoting one of the nervous ganglia of the Mollusca, which supplies the walls of the body, and the viscera.

PARIMA SIERRA, *pâ-rē′mâ sē-ĕr′râ:* great mountain system in the n.e. portion of S. America; known also as the Highlands of Guiana. It lies between the plains of the Rio Negro and Amazon, and those of the lower Orinoco river. A large part of the range is a plateau about 2,000 ft. above sea-level, much of it heavily wooded, but containing many valleys with fine natural pastures, and traversed by barren ridges with numerous elevated peaks, of which Maravaca and Duida rise about 8,000 ft. The w. portion is the most rugged. A strip of lowland lies between the mountains and the ocean. The Essequibo, Orinoco, and the Rio Branco rivers rise in this range.

PAR IMPAR, phrase *pâr ĭm′pâr* [L.]: odd or even.

PAR′ING AND BURN′ING: agricultural operation of cutting off the surface of the soil in thin slices, which are then dried and burned; the most effectual way of reclaiming peat and other waste land, the surface of which is matted with coarse plants, difficult of decay. It is also applied advantageously to cold clay soils, apt to produce rank weeds and coarse grasses, which are to be broken up after lying for some time in grass. The ashes of the plants, consisting of potash and other salts, act as a powerful fertilizer; while the clay being reduced to the state of brick-dust, both improves the texture of the soil, and acts as an absorbent for retaining moisture and nutritive gases, and giving them out to the roots of growing plants. On thin light soils the operation is rarely advisable, unless care is taken to make the turfs merely smolder, without flame; for much of the scanty volatile vegetable matter is dissipated. This expensive operation, much less common than formerly in England, is practiced scarcely at all in the United States.

PARI PASSU, phrase *păr'ī păs'sū* [L.]: with equal pace, steps, or progress. In law, a term signifying equally, in proportion; without undue preference; said especially of the creditors of an insolvent estate, who, with certain exceptions, are entitled to payment of their debts in shares proportioned to their respective claims.

PARIPINNATE, a. *păr'ĭ-pĭn'nāt* [L. *par*, equal; *pinna*, a wing]: in *bot.*, a compound pinnate leaf ending in two leaflets.

PARIS, *păr'ĭs*, Canada, a town and port of entry of Brant County, Ontario, on Grand river, at the intersection of the Great Western and Buffalo & Goderich branch of the Grand Trunk Railway, twenty-nine miles west of Hamilton. It is a busy industrial center with potteries, plaster mills, knitting mills, and oil refineries. In the neighborhood are extensive gypsum beds. Pop. (1901) 3,229.

PARIS: Ill., city, county-seat of Edgar County; on the Vandalia Line and the Cleveland, C., C. and St. L. R. R.'s; about eighteen miles northwest of Terre Haute, Ind., and 110 miles east by south of Springfield. It was founded in 1825 and incorporated in 1849. It is in a productive farming section, in which wheat, corn, and broom corn are cultivated extensively. The manufacture of brooms is a prominent industry. The streets are well kept and the city presents the appearance of fine homes of prosperous people. The park has an area of 100 acres, about seventy of which is an artificial lake. The charter under which the government is administered is according to the general law of 1872. The electric light plant and waterworks are owned and operated by the city. Pop. (1910) 7,664.

PARIS: Ky., city, county-seat of Bourbon County; on a branch of the Licking River, and on the Louisville and Nashville Railroad; about twenty miles northeast of Lexington. It was settled in 1784 and in 1862 was chartered as a city. It is in an agricultural section, in the 'blue grass region.' The chief trade is in tobacco, grass seed, whiskey, hemp, and horses. The prominent public buildings are the court-house, built in 1903, and the municipal buildings. There are public and parish schools and a library. The city owns the gas-plant. Pop. (1900) 4,603; (1910) 5,859.

PARIS: Tenn., city, county-seat of Henry County; on a branch of the West Sandy River, and on the Nashville, C. and St. L. and the L. and N. R. R.'s; about ninety-five miles west of Nashville. It is in a fertile agricultural region, in which cotton and tobacco are the chief products. There is an extensive trade in grain, cotton, several kinds of tobacco and proprietary medicines. There are flour and lumber mills, and railroad repair shops. Pop. 2,100.

PARIS: Texas, city, county-seat of Lamar County; on the Texas and P., the St. Louis and S. F., the Gulf

1. Place de la Concorde.
2. The Bourse.

C. and S. F., and the Texas Midland R.R.'s. The town was founded in 1845. In 1875 it had a population of 1,500, and in 1908 a population of about 11,000. Its affairs are managed, under a special charter, by a mayor and board of aldermen. The city has a well-equipped fire department and owns its own waterworks and sewerage system. The Federal government has a fine court-house and post-office building, and the county court-house is a magnificent granite structure. There are two telephone systems, an electric railway, and electric light and gas. There are four banks—three national and one private—with a capital of $1,000,000 and deposits of $1,500,000, several building and loan associations.

The city maintains an unsurpassed public school system for ten months in the year, with ample facilities for all children; the high school is affiliated with the State University as one of its preparatory schools. There is an excellent private seminary for girls. The Baptist, Methodist, Congregational, Presbyterian, and Cumberland Presbyterian churches all have brick and stone buildings; the Roman Catholic, Episcopal, and Christian churches have frame structures. The county and city jointly maintain a free hospital. The county has a well-managed poor farm for indigent and helpless poor. There is a private library association, a good library at the high school, and the Y. M. C. A. have a library in their building. The electric railway maintains a park and summer theater in the eastern suburbs. The lands surrounding Paris are famous for their production of cotton, corn, oats, alfalfa, fruits, and vegetables. There is a fruit and vegetable growers' association of over 200 members and two large cottonseed-oil mills, one large cotton oil refinery, with flour mills, iron foundry, candy factories, wood working shops, mattress and broom factories.

PARIS, *păr'ĭs*, F. *pâ-rē'* (ancient *Lutetia Parisiorum*): chief city and metropolis of France; 48° 50′ n. lat., and 0° 00′ long.; observatoire on both banks of the Seine, about 110 m. from its mouth. It is the second city in size in Europe, and the third or possibly the second center of population on the earth, being surpassed only by London and perhaps by greater New York (with the New Jersey suburbs) in actual number of inhabitants. The population, according to the census of 1901, is as follows: Paris, within the walls, 2,714,068; the northern suburbs (Arrondissement of St. Denis), 569,-066; the southern suburbs (Arrondissement of Sceaux), 386,630; total for Greater Paris, 3,669,764. This is the Department of the Seine, with an area of about 184 square miles. By way of comparison we may note that Greater New York, with 327 square miles of extent had at the census of 1900 about the same population, that is, 3,682,159. In 1905 the population of New York City according to the state census was 4,014,304.) With an

equivalent area the population of Paris exceeds 4,000,000. It is the only considerable modern city which is completely surrounded by a wall, and the population, in consequence of the confined area within the fortifications (about thirty square miles), is the most dense in Europe.

Topography.—Paris lies in a hollow about 200 ft. above sea-level, and is surrounded by low hills, which in their highest ranges to the north attain an elevation of only 290 or 300 ft., as at Montmartre and Belleville. These hills, separated by narrow valleys or plateaux, as those of St. Denis to the north, Ivry to the east, Montrouge to the south, and Grenelle to the southwest, are encircled at a distance of two to five miles by an outer range of heights, including Villejuif, Meudon, St. Cloud, and Mont-Valérien, the highest point in the immediate vicinity of the city. The Seine, which enters Paris in the southeast at Bercy and leaves it at Passy in the west, divides the city into two parts, and forms the two islands La Cité and St. Louis, both covered with buildings. Paris naturally divides itself into the Cité, the University, or the left bank, and the Ville, or the right bank, and to be understood it must be studied from these three points of view. Originally the town was all on the island, but even in the days of the Romans, villas and country seats were built on either bank, especially on the north bank up toward the heights of Montmartre, while on the south bank the Romans fixed their camp and at the same time the emperor's palace. By the time of Philippe Auguste the city had extended on the right bank as far down the river as to what is now the eastern façade of the Louvre, the foundation stones of which were laid by that monarch in the year 1223. The wall of Philippe Auguste extended from his palace to the Louvre in a wide loop northward and eastward to a point about the middle of the island of Saint Louis, as it now exists, and thence, across the river, in a smaller loop which crossed the rue Soufflot at the corner of the rue Saint Jacques, and passed near what is now the garden of the Luxembourg and close to Saint Germain des Prés, to a point on the river at the Tour de Nesle about on the site of the Institute. Like most river cities, Paris grew down the river rather than up. The size of the city within the walls was increased by the mural enlargement of Henry IV., and later by the new and greater fortifications of Louis XIV. The grand boulevard, on the right bank, from the Bastille to the Madeleine, runs along the line of the northern walls of Louis XIV., which were thrown down and demolished by Louis XV. The present walls were the work of Louis Philippe.

No city equals Paris in appearance. Since the work of the third Napoleon and his architect-engineer, Baron Haussmann, in opening new thoroughfares and in the construction of many new and splendid public build-

ings, in virtue of the essential physical regeneration of the city resulting from this construction and reconstruction which dates from the second empire, Paris has been incontestably the first of cities. Under the operation of the building laws and the regulations as to height, size, general character and style, pursuant to which Paris has been built and rebuilt for the past half century at least, the city may be said to be built to a scale—the form and quality of the construction being prescribed, and each new house as it were commencing as and where the last house left off. There is for example a uniform sky line as much as a uniform street line, with no architectural monstrosities, and with everything built under a central intelligent supervision, as part of a preconceived plan, which eliminates lawless individualism and the architectural vagaries resulting from personal caprice. Thus everything is made to conform, as part of a substantial uniformity, and to square with prescribed canons of good taste in building. Scarcely anything more impresses the visitor to Paris than the brightness and brilliance of the streets. They are kept scrupulously clean, and the wide asphalt sidewalks give opportunity for a life in the streets that is particularly pleasing. The plan and arrangement of the streets throughout the city, their width and the careful regulation of the traffic, facilitates easy and rapid transit, and consequently—in spite of the density of the traffic—they seldom seem exceptionally crowded. There is almost never a 'block' in the movement of vehicles in the streets, although through the grand boulevard and at certain corners elsewhere the traffic is much the densest in the world; as for example, through the Rue de Rivoli, where, according to some recent figures furnished by one of the asphalt paving companies, 42,025 vehicles pass the corner of the Rue du Louvre in twenty-four hours, while 20,480 pass a corner in the Rue Croix des Petits Champs, and 19,592 a point in the Rue Saint Honoré in the same length of time. The boulevards, which extend in semi-circular line on the right side of the Seine, between the nucleus of the city and its surrounding quarters, present the most striking feature of Paris life. In all the better parts of the city they are lined with trees, seats, and little towers called *Vespasiennes*. Restaurants, cafés, shops, and various places of amusement succeed one another for miles, their character varying from the height of luxury and elegance in the western boulevard des Italiens to the homely simplicity of the eastern boulevards Beaumarchais and St. Denis. Among public squares or *places*, most noteworthy is the Place de la Concorde, which connects the Gardens of the Tuileries with the Champs-Elysées, and gives a magnificent view of some of the finest buildings and gardens of Paris. In the centre is the famous obelisk of Luxor, covered over its entire height of 73 ft. with hieroglyphics.

Of other squares, the following are some of the most handsome: Place du Carrousel, between the Tuileries and Louvre; Place Vondôme, above referred to, with Napoleon's Column of Victory; Place de la Bastile, where once stood that famous prison and fortress; Place Royale, with two fountains and a statue of Louis XIII.; Place de l'Hôtel de Ville, formerly Place de la Grève, for many ages the scene of public executions, and the spot at which some of the bloodiest deeds of the Revolution were perpetrated.

The Champs de Mars.—A great open square, 1,100 yards in length and 550 yards in width, extending to the river, opposite the Trocadéro—which was originally designed for military maneuvers, and was the site of many imposing ceremonies and pageants during and immediately after the Revolution, has recently been condemned and will be laid out in streets and built up.

Fortifications.—Paris was surrounded, under Louis-Philippe, with fortifications extending 30 m. round, and costing more than $27,000,000. The enceinte, with its 94 bastions, is about 22 m. in length. The ramparts, averaging 32 ft. in height, with a parapet 19 ft. in width, are environed by a moat 48 ft. in width, and a glacis. The approaches to the city are also commanded by 17 detached forts at different but relatively short distances from the walls. A second line of forts at a greater distance from the ramparts has also been constructed on the heights commanding the valley of the Siene. The area included within this elaborate system of fortifications is 400 sq. m. The garrison numbers 50,000 men, the pick of the French army.

The Seine and the Bridges.—The Seine, which flows for a distance of between seven and eight miles through the city, is contained within high walls of the most massive masonry. On either side of the river from one end to the other there is a broad street, lined with trees, and next to the river on the quai is a sidewall or pavement. Below the quais and near the level of the water are ports, also of masonry, where boats can land and freight and passengers be received and discharged. The bookstalls on the quais have long been famous. Passenger steamboats (*bateaux mouches*) ply up and down the river, making stops every few blocks and affording an excellent service for a fare of two cents at all seasons of the year. By means of locks and dams the river is kept at all stages of water at about the same height, the minimum depth being 10½ ft., so that boats of 800 tons burden can come to Paris from Havre. This in connection with the extensive system of canals of northern France which centre in Paris, makes of the capital the second port of the country. It is equaled in tonnage only by Marseilles.

The Seine, in passing through Paris, is spanned by 33 bridges. The most celebrated and ancient are the Pont

Notre-Dame, erected in 1500, and the Pont-Neuf, begun in 1578, completed by Henri IV. in 1604, and thoroughly renovated in 1852. This bridge, which crosses the Seine at the north of the Ile-de-la-Cité, is built on 12 arches, and abuts near the middle on a small peninsula jutting into the river and planted with trees, forming a background to the statue of Henri IV. on horseback which stands in the central open space on the bridge.

The Pont-Alexandre III., the newest of the bridges and one of the notable contributions of the exhibition of 1900 to the adornment of the city, is a single steel span crossing the river so as to connect the Champs-Elysées and the Esplanade des Invalides, affording a direct passage from the Palace of the Elysée to the Hotel des Invalides. The viaduct bridge at Auteuil is a mile and a quarter long, constructed throughout of masonry, with several galleries for vehicles and foot passengers beneath the railway line, and consists of 234 cross arches. It is a structure of exceptional beauty. The Pont Notre-Dame and the Petit Pont cross the two arms of the river at the island of the city in the line of the rue Saint Jacques and the rue Saint Martin, being thus situated precisely at the places of the first Roman bridges that crossed the river. Among the other bridges are the Pont des Arts, which is the only bridge in Paris which is simply a foot-bridge, connecting the Institute and the Louvre; the Pont au Change at the Chatelet and the Pont Saint-Michel at the place of that name; the Pont de la Concorde, 160 yards long, built in 1787–90; the Pont du Carrousel, Pont d'Austerlitz, and the Pont d'Jéna, both of the time of the First Empire; and the Pont des Invalides, Pont de l'Alma, and Pont de Solférino—all handsome structures, adorned with military and naval trophies commemorative of events and victories connected with the Second Empire.

Sewerage.—About 1630 the present sewerage system was undertaken. It progressed at first but slowly, and only about 1854 has it been efficient and relatively complete. It consists of an elaborate network of drains covering the entire area within the walls, constructed of stone and concrete in the most substantial manner, divided into 15 classes, from the great sewers of the first class, which are 18 ft. and 2 in. in height by 11 ft. and 4 in. wide, down to the little drains a few inches in diameter, that connect each individual house with the street drain. The discharge is carried by a tunnel far down the river below the city, where the liquid portion escapes into the river at Asnières, while the solid parts are connected and utilized as fertilizer in the peninsula of Gennevilliers. The city is divided, for drainage purposes, into four parts, by the two main sewers which run at right angles to the river under the boulevard de Sébastopol and the boulevard Saint Michel respectively. These are discharged, not into

the river, but into eight channels parallel with it, which in their turn receive the contents of fifteen tributaries fed by numerous smaller drains. The total length of the network is in excess of 900 m.

The Catacombs.—Below the sewers on the left bank are the catacombs. They are the remains of ancient quarries, worked as far back as the Roman period, for the limestone of which Paris is built. They extend under a considerable part of the left bank. They were first used during the Revolution as depositories for bones and dead bodies removed from the cemetery of the Innocents, which was closed at that time. They have therefore been charnel houses and known as catacombs only from that period.

Underground Transit.—The most important feature of underground Paris to the average man is the Metropolitan Underground railway, which was opened in 1900. It consists of lines running in various directions throughout the city, especially of a main line though the centre of town east and west, from the Porte de Vincennes to the Porte Maillot, a distance of about seven miles, and another more northerly line from the Place de la Nation to the Bois de Boulogne, making a loop of about eight miles in length. There are many connecting branches touching the Place de l'Opéra and several of the principal railway stations. Extensions bring the lines to every part of Paris. Automobile omnibuses, carrying 30 passengers and weighing but 5,600 kilos, with a speed of more than double that of the old horse omnibus, are used. These new omnibuses run in connection with the Metropolitan, constituting the lesser arteries of the system of intramural transit of which the lines underground constitute the main arteries. No description of Paris underground would be complete without mention of the new and splendid station of the Orleans railway line on the Quai d'Orsay, and the tunnel runs under the quais and next to the river connecting it with the main station, two miles distant, at the Quai d'Austerlitz. It is regarded as an almost perfect installation. The canals which traverse Paris, some of the underground for long distances, for example, under the Place de la Bastile and through the boulevard Richard Lenoir, are interesting displays of engineering and building skill.

The Parks.—Although necessarily within the fortifications the area of parks and open spaces is relatively limited, there are within and without the walls—but within easy distance—including Fontainebleau and Versailles, about 200,000 acres of public parks, of which 20,000 acres are within 30 minutes' travel from the centre of the city. The Bois de Boulogne and the Bois de Vincennes are the two largest strictly urban parks. The former extends to upwards of 2,250 acres, and lies between the western fortifications and the Seine. The Hippodrome de Longchamps in the Bois de Boulogne

is the principal race course in the neighborhood of Paris. The Bois de Vincennes is on the other and less fashionable side of the city. It contains about 2,250 acres. The other principal parks within the city are the Jardin du Luxembourg, in the Latin quarter; the Jardin des Plantes, with its museums of natural history and zoology; the Champs Elyées, most famous of city promenades; the Parc Monceau, the Parc de Montsouris, the Parc des Buttes Chaumont, and finally the Jardin du Palais Royal and the Jardin des Tuileries in the very heart of the town.

The Monuments.—First, perhaps, among the monuments that adorn the city is the Arc de Triomphe de l'Etoile, which stands in the spacious Place de l'Etoile, on an eminence at the head of the avenue, des Champs-Elysées. From this arc radiate 12 great avenues, like the spokes of a wheel, chief among which, after the avenue des Champs-Elysées, are the avenue du Bois de Boulogne, leading to the parks, and the avenue de la Grande Armée, leading to Neuilly. This famous monument is the largest triumphal arch in existence. Its height 160 ft., its width 146 ft., and its depth 72 ft. It consists of a main arch 67 ft. high and 46 ft. wide, intersected at right angles by a lower transversal arch. The work was begun by Napoleon in 1806 and finished by Louis Philippe in 1836. It is adorned with colossal trophies 36 ft. high, with figures 16 ft. high, its cost having been about 2,000,000 francs.

The Arc de Triomphe du Carrousel in the gardens of the Tuileries, built by Napoleon to commemorate his victories of 1805 and 1806, Somewhat similar to these in general character are the Porte Ste. Martin, in the grand boulevard—a triumphal arch 57 ft. in height, erected in 1674 in honor of Louis XIV.; and the Porte Saint Denis, another triumphal arch near by in the same thoroughfare, consisting of a single archway, 81 ft. in height, built to commemmorate the victories of the grand monarch in the Low Country.

The Tomb of Napoleon under the dome des Invalides is a magnificent mausoleum, the tomb itself consisting of a sarcophagus of reddish brown granite from Finland, weighing 67 tons, and being 13 ft. long, 6½ ft. wide, and 14½ ft. high.

The Column Vendome, 142 ft. high and 13 ft. in diameter, constructed from German cannon captured in the Napoleonic wars, surmounted by the bronze statue of Napoleon as a Roman emperor, stands in the centre of the Place Vendome. The column of July in the Place de la Bastile, erected by Louis Philippe, in 1831, celebrates the heroes who fell in the Revolution of 1830. It is 154 ft. high.

Other conspicuous monuments are the statue of the Republic in the Place de la République, and the equestrial statues of Louis XIV. in the Place de la Victoire, of Etienne Marcel at the Hotel de Ville, of Washington

in the Place d'Iéna, of Joan of Arc—two, one opposite the Church of St. Augustin and the other in the Place de Rivoli—and of Charlemagne in the Parvis de Notre-Dame. The monuments of Gambetta at the Louvre, of Danton in the boulevard Saint Germain, of Molière in the rue Richelieu, of Shakespeare in the boulevard Haussmann, of Marshal Ney near the Observatoire, of La Fontaine in Passy, of Dante at the College de France, of Voltaire on the quai at the Institute, are among the many fine monuments that adorn the city. Another of particular interest to Americans is the reduced copy of Bartholdi's 'Liberty Enlightening the World' in bronze, on the Pont de Grenelle, presented to the city by the American colony in Paris, which has carved on its base simply the two great republican dates, '1776–1789.'

The Tour Eiffel is built on the end of the Champs de Mars next to the river. It is a full 1,000 ft. high (1,062 ft. to the very top).

The Fountains.—The two large and beautiful fountains in the Place de la Concorde, constructed in 1836, contribute very much to the brilliance of that finest of Parisian squares. They each consist of a round basin 53 ft. in diameter, above which rise two smaller basins surmounted by a spout from which a jet of water rises 28 ft. in the air. The lower basins are surrounded by tritons and nereids, holding dolphins, which spout water into the second basins. Two handsome modern fountains in granite ornament the Place du Theatre Français. Another of the great fountains is that of Saint Michel in the Place of the same name. It was constructed in 1860, and is 84 ft. high and 48 ft. wide, built into a wall. It consists of a niche in the form of a Roman triumphal arch containing a group of Saint Michel and the dragon in bronze mounted on a pile of rock, from which water gushes into three basins one above the other, flanked by bronze griffins of heroic size. At the sides of the niches are columns of red marble bearing bronze figures. The fountain of the Observatory, constructed in 1874, in the fine avenue of the Observatory, consists of eight sea horse, a group of four allegorical figures bearing an armillary sphere and water-spouting dolphins and tortoises. The basin is 60 ft. in diameter. The fountain of St. Sulpice was erected in 1847 in front of the church of that name and consists of three concentric basins of stone one above the other, and is embellished with statues of heroic size of the four most celebrated French preachers: Bossuet, Fénelon, Massilon, and Fléchier. The fountain Molière, erected in 1844 to the memory of the famous dramatist, stands on the rue Richelieu near the house where he lived and died. It is 51 ft. high and 21 ft. wide, with a bronze statue of the poet flanked by the muses of serious and light comedy. Near by in the same street in the small

square Richelieu, facing the Bibliòtheque Nationale, is the fountain Richelieu, in bronze, dedicated to the four great rivers of France. The fountain de Grenelle in the street of that name near the rue de Bac, erected in 1739, consists of a crescent 100 ft. in diameter and 38 ft. high, in the centre of which stands a small Ionic portico with an allegorical group in white marble representing the city of Paris with the Seine and the Marne. Two fountains in the Jardin du Luxembourg—the old fountain de Médicis and the new one in memory of Delacroijx—the ancient fountain of the Innocents at the central markets, and the splendid fountain de la Victoire in the Place du Chatelet, erected in 1807 to commemorate the earlier victories of Napoleon, are each of them notable monuments. A mention of the wonderful fountains at Versailles (*les grandes eaux*) incomparably the finest in the world, completes the general view of the fountains of Paris.

Palaces and Public Buildings.—The Palace of the Tuileries was begun in 1566 by Catharine de' Medici, and enlarged by successive monarchs while it was a royal residence, until it formed a quarter of a mile in length, extending at right angles to the Seine. East of the Tulleries, at a distance of more than a quarter of a mile, was erected the palace of the Louvre (see paragraph *Museums and Art Galleries.*)

North of the injured part of the Louvre is the Palais Royal, the most valuable part of which, fronting the Rue St. Honoré, was fired by order of the Commune in 1871. Next after the Louvre, the Palais du Luxembourg, which is the seat of the Senate, is perhaps the most notable palace in the city. It was erected in 1615–20 for Marie dé Mĕdicis, the widow of Henry IV., and was modeled in general after the Pitti Palace in Florence. The Musée du Luxembourg—a gallery of modern art—and the fine gardens of the Luxembourg adjoin it. The Luxembourg was formerly the house of the peers, after 1871 was used as the prefecture of the Seine, and 1879 became the meeting-place of the French senate. The senate chamber is in form a double hemicycle, the larger with 300 seats and desks for the senators, the smaller for the president of the senate. The Palais Bourbon, in which the Chamber of Deputies has its seat, is situated on the left bank of the Seine, facing across the river to the Place de la Concorde. It was built by the Prince de Condĕ in 1722 at a cost exceeding 20,000,000 francs. In 1790 it was confiscated, and became national property.

The Pantheon stands on the highest ground on the left bank on the site of the tomb of Sainte Geneviève, the patron saint of Paris. It was built by Louis XV. (1764–90) from plans by Soufflot, and was designed to be the church of Sainte Geneviève. But in 1791 the convention converted it into a sort of memorial temple, naming it the Pantheon. It is in form a Greek cross

with equal arms, 370 ft. long and 276 ft. wide, surmounted by a dome 272 ft. high and more than 75 ft. in diameter, the lantern at the top of which is reached by a staircase of 425 steps. A huge colonnade consisting of 22 fluted Corinthian columns 81 ft. in height, resembling that of the Pantheon at Rome, forms the portico, to which 11 steps ascend. The tympanum, 117 ft. long and 23 ft. high, contains a fine group of sculpture by David d'Angers.

The Palais du Trocadéro, on the elevation in Passy, opposite the Champ de Mars, is a huge building in the oriental style. It consists of a circular edifice 190 ft. in diameter and 180 ft. high, surmounted by a dome and flanked by two minarets 270 ft. high. On each side extends wings, 660 ft. each in length, the whole in the form of a crescent. The main building contains a Salle des fêtes with an immense organ, and has seats for 6,000 persons. This is the largest auditorium in Paris. The palace contains important museums of comparative sculpture and ethnography. The Palace of the Order of the Legion of Honor, instituted by Napoleon in 1802, is situated on the Quai d'Orsay, at the corner of the rue Solférino. It was burned in 1871 by the Commune, but has been handsomely rebuilt. The original building was erected in 1786.

The Hotel de Ville for almost 550 years has been the town-hall of Paris. It was in 1357 that Etienne Marcel—first of democrats, and the most famous of the ancient *Prévots des Marchands*—purchased for the city of Paris 'the House of Pillars' on the Place de Grève and established there the municipal headquarters, which had theretofore been at the Parlour of the Bourgeois, on the other side of the river. The House of Pillars continued to be the seat of the municipality until it was demolished by Francis I., in 1532, to make room for the new Hotel de Ville, begun by him in that year and completed in the reign of Henry IV. This building was enlarged and reconstructed from time to time, and was finally destroyed in May 1871 by the Commune. The present building, which may be described as an enlarged reproduction of the original, was undertaken by the republic shortly after the war of 1871. It is a rectangular structure in the style of the renaissance, with the most elaborate ornamentation, exterior and interior. After the Grand Opera, it is the most sumptuous public edifice in Paris.

Few buildings in Paris are more interesting than the ancient *Palais de la Cité*. Situated near the western end of the island of the city, it was a royal residence continuously the latter part of the 14th century. It was the seat of government under the Romans. Abandoned as a royal residence, and later presented to the parliament by Charles VII. in 1431, it became the Palais de Justice, thus perpetuating its judicial char-

acter. It has therefore been the seat of justice in Paris in one form or another from the time of Christ. It has of course been built and rebuilt again and again. The present building dates from the reconstruction of Robert the Pious in the 11th century; Louis IX. in the 13th century and Phillipe le Bel at the commencement of the 14th century made considerable additions to it. The great tower clock dates from 1370, having been, however, reconstructed in 1685 and again in 1852. It is the oldest public clock in France. One of the most interesting features of the present building is the *Salle des Pas Perdus*, an immense hall, consisting of two vaulted galleries 240 ft. long, 90 ft. wide and 33 ft. in height, which serves as a sort of vestibule to most of the civil courts of first instance. Near by and in the same part of the Palais is the Conciergerie, a prison famous in French annals, where, for example, are to be seen the chamber in which Marie Antoinette was imprisoned and the cell occupied by Robespierre. Among the numerous court rooms the most notable are the chambers of the Court of Cassation and of the Court of Appeal, both large and sumptuous rooms, with superb decorations. The great hall, on the western side next to the Place Dauphine is called the Vestibule de Harlay. It contains statues of the four French monarchs most conspicuous as legislators—Charlemagne, Philippe Auguste, Saint Louis, and Napoleon—and rivals the *Salle des Pas Perdus* in size. Opposite the Palais de Justice, across the boulevard du Palais, is the Tribunal de Commerce, dating from 1866. It has a conspicuous dome 135 ft. in height. Most of the courts of general jurisprudence in Paris sit in one or other of these two buildings. The Ministry of Foreign Affairs, one of the handsomest government buildings in Paris, adjoins the Champ de Mars on the east along the Quai d'Orsay.

Public Education.—The public school system of Paris in its present form is substantially the work of the Third Republic. It commences with the material schools (*écoles maternelles*) directed by women, which receive children of both sexes from 2 to 6 years of age, and give them care and elementary instruction in reading, writing, and ciphering. Next come the primary schools, separate for boys and girls, which receive and instruct children from 6 to 13 years of age. Pupils go from these schools to the superior primary schools, and thence for secondary classical courses to the lycées and colleges, which confer the degrees of bachelor in letters and bachelor in science. There are ten superior primary schools, six lycées supported by the city, and two by the state, and three colleges; these lead to the university and the professional and technical schools. There is also a system of free public night schools for adults, both men and women. There are about 125 of these schools with some 12,000 pupils.

There are in connection with the various public schools about 400 libraries containing useful and instructive books (no fiction) to be loaned to the pupils. In addition, all necessary books and stationery are furnished free to all the pupils in the primary and superior primary schools. The city also furnishes to all the day scholars a déjeuner, that is, the meal, at the noon hour, consisting of hot soup, and vegetables. Some parents pay a small fee, when they are able, for this luncheon, but the poor pay nothing. Shoes and clothing are also provided for children whose parents are unable to furnish them. Elementary education is obligatory as well as free. Mixed schools are not tolerated in Paris. During the summer vacation the city provides excursions—from a day or two to a month in length—for the children of the poor, to the seaside or to the country, sometimes to Switzerland. Each child is required to keep a diary of his excursion, which is subsequently treated as an exercise in composition.

The University.—According to tradition the foundation of the university dates from 780, when Charlemagne called the famous Alquin to Paris, and established a school for him at Notre-Dame. The authentic annals, however, seem to commence with Pierre Abelard about 1107. Under him the institution still in the cloisters of the cathedral began to gain that international prestige which it has never lost. In 1200 it received a royal charter from Philippe Auguste; in 1208 Innocent III. gave it a papal charter; and in the 14th century Charles V. conferred upon it the title of 'the eldest daughter of the kings.' The university remained on the island and under the shadow of the cathedral until the beginning of the 13th century, when it passed over climbed up the hill of Ste. Geneviève. The first buildings of the faculty of arts were put up in what is now a Latin quarter in the 13th century near the church of Saint Julien le Pauvre in the old rue du Fouarre. The Faculty of Law and the School of Medicine were both founded in the 12th century, the law school dating from 1160. From the beginning of the 13th century to the end of the 16th the Sorbonne was a sort of international theological parliament which the nations and kings of Europe consulted on great political and religious questions (as, for example, Henry VIII., of England, on the annulling of his marriage with Catherine of Aragon), and which assumed the function of pronouncing upon the orthodoxy of new books, condemning to destruction by fire such as were not conformed to its ideas. During the Middle Ages there were at the university separate colleges for each of the four nations, France, Picardy, England, and Normandy, with much rivalry between them. After the re-entry of Charles VII. to Paris in 1437, the college of England was changed to that of Germany. The

seals of these collegiate 'nations' are preserved in the British Museum. The university was governed by a rector for many centuries, who during the Middle Ages was the supreme power in all the territory of *'l'Universite'* both in civil and criminal affairs affecting the students. It was the privilege of the students to be condemned and hanged only by the court of the rector. At present there are ordinarily in Paris from 15,000 to 18,000 students in attendance on the courses of the university (among them about 5,000 in the law school), together with several thousand more in the various technical, art, and industrial schools which work independently of the university; for example, the Collége de France, the Beaux-Arts, the Polytechnic School, Ecole des Ponts et Chaussées, the School of Mines, the Normal School, the Conservatory of Music, Arts et Métiers, Hautes Etudes, the Ecole des Chartes, the School of Living Oriental languages, etc. Thus there are always in Paris an average of not less than 25,000 students of one sort or another—not including the students in the various lycées and colleges. The 27 libraries of the university contain in the aggregate more than 1,000,000 volumes.

Close by the Hotel des Invalides is the Military School (*Ecole Militaire*), another great block of buildings covering 26 acres, the façade of the main building being about a quarter of a mile long. It was founded by Louis XV. in 1751. There are about 500 students, the greater part of the establishment being now used as a caserne.

The Institute.—Chief among the literary organizations of Paris is the Institute. It is installed in the ancient College Mazarin, or the College of the Four Nations, founded by Mazarin, situated on the left bank, at the end of the Port des Arts, opposite the Louvre. The building dates from the latter part of the 17th century, and stands on the site of the hotel de Nesle. During the Revolution it was used as a prison; but in 1795 it was ceded by the Convention to the Academies, or Societies of Savants, which had theretofore been housed at the Louvre. The Institute, which was created 1795, Oct. 25, embraces the five academies, namely: the Académie Française, founded about 1629 by Richelieu; the Académie des Inscriptions et Belles-lettres, founded in 1635 by Colbert; the Académie des Sciences, founded in 1666; the Académie des Beaux-Arts, founded in 1819; the Académie des Sciences Morales et Politiques, founded in 1666, but suppressed in 1803 and re-established in 1832. Each of the academies has 40 members, except the Academy of Sciences, which has 66, and all except the Académie Française have honorary, corresponding, and foreign members. The Académie Française, the most distinguished of the five—its members being dubbed 'the 40 immortals'—is charged with a superintendence of the language, the orthography and pronunciation, and with the publication and period-

ical revision of the Dictionnaire de l'Académie (last edition, 1878). The functions of the other four are sufficiently indicated by their names. The title 'Membre de l'Académie Française,' are objects of the highest ambition of every literary man in France. Vacancies as they occur are filled by ballot of the surviving members, each of the academies for itself, subject to the approval of the government. No one is eligible except French citizens, but they need not be native born citizens. They must, however, live in Paris.

Libraries.—No city was ever so rich in books and libraries and literary treasure as Paris. The Bibliothèque Nationale has always been unrivaled. It has been known in its long history successively as La Bibliothèque du Roi, Royale, Nationale, Impériale, and now Nationale again. It was founded in the 14th century by John II., and then consisted of but eight or ten volumes; it was housed at first in the Palais de la Cité. Charles V. is sometimes called its founder because he removed it to the Louvre and increased it to 910 volumes during his reign. Francis I. transferred it to Fontainebleau, but was brought back to Paris by Henry IV. Subsequently it was stored in various places in the city, but was finally located in the Palais Mazarin, in the rue Richelieu, now more than 200 years ago, where it has since remained. Under Francis I. it contained 1,890 volumes; 16,746 under Louis XIII.; 50,542 under Louis XIV.; and about 100,000 at the time of the destruction of the religious houses during the Revolution, at which time their libraries were incorporated with it. It now contains more than 3,000,000 printed books, 100,000 manuscripts, 2,500,000 plates, engravings, stamps, and maps, and 120,000 medals and inscriptions. It is a public library, free for study, reading and reference, with no vexatious restrictions, at all times except holidays. Other noted libraries are the Bibliothèque Sainte Geneviève, with 220,000 volumes and 3,500 manuscripts; the Bibliothèque de l'Arsenal (which, after the Bibliothèque Nationale, is the finest in Paris), with 500,000 volumes, 10,000 manuscripts, 2,500 cases containing papers and documents from the Bastile, and 100,000 engravings; the Bibliothèque Mazarine, with 300,000 volumes and 5,000 manuscripts; and the Bibliothèque de la Ville, with 210,000 volumes, 25,000 manuscripts, and 75,000 engravings and charts. There are also many technical libraries at the various schools and colleges of the university and elsewhere for the use of students and investigators. In addition to the libraries of the university (1,000,000 volumes), to which reference has already been made, mention should be made of those of the Senate, the Chamber of Deputies (130,000 volumes), of the Council of State at the Palais Royal, of the Institute of the School des Beaux-Arts, of the School of Mines, of the Hotel de Invalides, of the Chamber of Commerce, of the several Ministries (War,

Marine, Colonies, Justice, the latter containing 40,000 volumes), of the Conservatory of Music, of the Opera, of the Theatre Française, etc. The Archives Nationales occupies the beautiful hotel Soubise, in the Marais, and, as its name indicates, contains a collection of national archives dating from the Merovingian kings, an immense number of charters, maps, letters, documents of all sorts, of the kings, of the parliaments, of the empire, and of the ancient arisian jurisdictions like the Chatelet, the Chamber des Comptes, etc. The city of Paris, moreover, maintains 79 free public libraries—two or more in each of the 20 arrondissements. See LIBRARIES.

Galleries of Art and Museums.—The Louvre is the chief art gallery of Paris. The Louvre itself was a royal castle from the days of Philippe Auguste until Louis XIV. built the palace at Versailles. The existing structure which superseded the work of Philippe Auguste was begun by Francis I. in 1541, and was added to and extended by his successors down to and including the third Napoleon. Since 1793 the greater part of the interior has been occupied by the famous museum and art galleries of the Louvre, although the wing on the rue de Rivoli is occupied by the Ministry of Finance. It has an unrivaled situation on the Seine and on the rue de Rivoli, facing the gardens of the Tuileries and the Place de la Concorde. It covers an area of more than 48 acres, and only the papal palace of the Vatican can be compared to it for size and magnificence. The galleries contain a vast collection of paintings, sculpture, objects of art and antiquities to which only the collections of the Pitti-Uffizi Gallery at Florence and of the Vatican at Rome can fairly be compared. They are entirely free, and open to the public at fixed hours daily. The next gallery in importance and interest is that of the Luxembourg, in the gardens of the Luxembourg adjoining the palace. It is a museum of no great size of living artists, opened in 1886. Among the great number of other collections may be mentioned the Musée Cluny, in the boulevard Saint Germain, dating from 1840, possessing not only the interesting Roman ruins of the ancient Palais de Thermes, but also a valuable collection of mediæval furniture and objects of art from the Middle Ages; the Musée Carnavalet—the museum of the city of Paris—containing an invaluable collection of objects connected with and illustrating the history of the city in all its centuries of existence, located in the hotel of Madame de Sévigné, in the rue de Sévigné, in the Marais; the Musée of Artillery at the Hotel des Invalides, containing a very large collection of arms, ancient, mediæval and modern; the Musée of the Trocadéro, which contains a collection of sculpture illustrating various phases of ancient and mediæval architecture, together with an interesting ethnographic exhibition; the Musée Guimet; the Musée

Galliera, in the rue Galliera, not far from Trocadéro; etc.

The Observatory.—The Observatory has a history going back to 1371. The work was at first carried on in a building which stood on a site northwest of the hotel de Cluny, and which would now be in the middle of the boulevard Saint Germain. Charles V. provided the necessary instruments and charts, and endowed two scholarships there for the study of astronomical science. The present Observatory, however, was founded by Louis XIV., in 1672. It is situated at the end of the avenue de l'Observatoire, south of the Luxembourg. The meridian of Paris is traced through the large hall on the second floor, and the latitude of the south façade is held to be that of Paris. The intersecting joints of these two lines is the base from which all geographical and astronomical calculations are made.

Theatres and the Opera.—The leading theatre of France is the Théâtre Français. It was founded in 1600 at the hotel de Bourgogne in the Marais, and was under the superintendence of Molière from 1658 until his death in 1673. The present house in the rue Richelieu, adjacent to the Palais Royal, was built in 1782, after his death. The interior was destroyed by fire in 1900, but it was immediately restored and rebuilt (1,400 seats). It contains a valuable theatrical library, and many theatrical art treasures. This great theatre was given its present pre-eminence in 1680, when Louis XIV. suppressed its rival, the theatre of the Marais, and consolidated the troupe of Molière which then still played at the hotel de Bourgogne, with the Theatre Guénégaud in the rue Mazarine, thus creating a single theatre for Paris and eliminating all competition. This became what is now the Théâtre Français, and has had a continued existence from that day to this. The Théâtre Française—sometimes called La Comédie Française—stands, however, second in official priority to the Grand Opéra, which is now the first play house in Paris. The opera house, a sumptuous edifice, bearing the inscription, '*Académie Nationale de Musique*,' standing at the head of the avenue de l'Opéra, was commenced in 1861 and completed in 1874. It occupies a site just off the grand boulevard, covering an area of nearly three acres. It seats 2,200 persons. The site alone cost more than $2,000,000, and the building about 30,000,000 francs. It has an annual subvention from the government of 800,000 francs. The Opéra Comique, dating from 1761, which was destroyed by fire in 1887, has been splendidly rebuilt (1,500 seats), and stands next to the Grand Opéra in the amount of its subvention. It receives 300,000 francs annually from the government. The Odéon (1,420 seats), dating from 1782, on the left bank, near the Luxembourg, ranks in some respects next to the Théâtre Français, and is devoted chiefly

to the performance of classical dramas. The four theatres just mentioned are open the year round, except for a short time in midsummer. The Grand Opéra and the Odéon give gratuitous performances two or three times a year, in recognition of their public character. Other leading theatres are the Chatelet (3,400 seats), the largest theatre in Paris, dating from 1780; the Gaite (2,000 seats), dating from 1753; the Vaudeville (1,100 seats), dating from 1792, in the boulevard des Capucines; the Théâtre Sarah Barnhardt (1,690 seats), in the Place du Chatelet; the Folies Dramatiques (1,600 seats), dating from 1831; Antoine (1,000 seats); the Ambigu-Comique (1,500 seats), dating from 1769; and the Palais Royal (850 seats), dating from 1789. There are in all in Paris about 40 theatres of the first class, besides a great number of secondary play-houses. Such institutions as the Moulin-Rouge, the Folies-Bergère, the Casino de Paris, the Olympia, the Concerts Rouge, the Concerts Colonne, the Nouveau Cirque, the Ambassadeurs and the Jardin de Paris have a world-wide reputation, while places like the Bal Bullier, the Bal Tabarin, the Palais de Grace, and the Hippodrome are also well known and appreciated.

Churches.—Among the monumental buildings that adorn the capital the cathedral of Notre-Dame holds the first place. Its foundations were laid upon the ruins of a temple of Jove, first about 375 A.D., and rebuilt again and again; the present edifice upon the original site having been begun in 1163. The choir was finished in 1195, the façade in 1218, and the towers in 1225. It was the first conspicuous embodiment of the Gothic ideal in church architecture. Notre-Dame is accordingly not only one of the oldest, largest and most interesting churches of the world, but it is architecturally one of the most impressive buildings ever erected.

Next after Notre-Dame the most interesting church in Paris from an architectural point of view is the Sainte Chapelle at the Palais de Justice. It is said to be the most perfect specimen of pure Gothic architecture in existence. It was built by Louis IX. in 1245. Saint Julien le Pauvre, which in its origin goes back to the first centuries of the Christian era, stands just out of the rue Saint Jacques in the rue Galande. Saint Germain des Près, in the boulevard Saint Germain, founded by Childebert in 543, with its barbaric tower of the 9th century, is on the left bank. Saint Eustache, at the markets, begun in 1532, a church of great size and impressiveness; Saint Sulpice, near the Luxembourg, with its great organ; Saint Roch, in the rue Saint Honoré from the steps of which Bonaparte, then a young officer of artillery, trained his cannon upon the mob at the commencement of the revolution; Saint Augustin in the boulevard Maresherbes, and Saint

Clotilde near the Palais Bourbon; Saint Thomas d'Aquin, in the faubourg Saint Germain; Saint Etienne du Mont, under the shadow of the Pantheon, with its beautiful jubé, or rood-loft, of exquisite workmanship, and the two graceful staircases ascending to it, the jubé dating from 1609; the Madeleine, in the grand boulevard; Saint Vincent-de-Paul, with its splendid approach from the rue LaFayette, and Saint Germain l'Auxerrois at the Louvre, are among the most notable of the churches. The new and splendid church of the Sacré Cœur on Montmartre, commenced after the war of 1871, is the most considerable religious edifice which has been built in modern times. It has already cost upward of $5,000,000, and is still far from completion. Paris is divided into seventy parishes, and there are in all about 140 places of worship, of which eighty-six are Catholic.

The Restaurants and Hotels.—Many of the famous restaurants such as the Maison Doré (like Tortoni and Hardy, now only a memory), Paillard, Café de Paris, Café de la Paix, the Ritz, Voisin, Durand, Marguery, Café Anglais, Foyot, Tour d'Argent (dating from 1582, and thus possibly the oldest of restaurants), Cafè Riche, and des Ambassadeurs have a world-wide reputation. Among the great hotels, the Grand, with its 1,000 rooms and superb location at the Place de l'Opéra, is pre-eminent. Other large hotels of the first class are the Ritz and the Bristol in the Place Vendome, the Elysèes, the Continental in the rue de Rivoli facing the gardens of the Tuileries, the Terminus at the Gare Saint Lazare, the Regina, the Grand Hotel du Louvre near the Palais Royal, the Moderne in the Place de la République, the Scribe and l'Athénée near the Opéra, and the Mercedes at the Place de l'Etoile.

Assistance Publique.—Assistance Publique in Paris dates from the tax which Louis XIV. imposed, in 1677, on the gross receipts of the theatres for the benefit of the hospitals and asylums. This tax exists to-day and for the same purpose. Now it is ten per cent. of the price of the ticket and is assessed against the theatre itself. Numerous hospitals and asylums existed in Paris during the Middle Ages. The principal one was always the Hotel Dieu, and it is still the first of Parisian hospitals. It is situated on the island of the City near Notre-Dame. The present building was erected in 1868-78 at a cost of 45,000,000 francs. It is admirably fitted up with 828 beds. It is said to be the oldest hospital in Europe, having been founded in 660 A.D. under Clovis II. There are about twenty other general public hospitals in Paris, which have an aggregate of upward of 33,000 beds; among which may be mentioned La Pitié near the Jardin des Plantes, with 729 beds; the Charity Hospital, in the rue Jacob, and the military hospital of Val de Grace in the Latin quarter. Among the numerous asylums, the most notable is

the Salpêtrière, undoubtedly the largest institution of its kind in the world. It is situated near the Pont d'Austerlitz on the left bank, and was originally an arsenal built by Louis XIII., which was subsequently converted into an asylum for aged and insane women. It consists of forty-five huge buildings, having in the aggregate no less than 4,682 windows. There are 8,000 inmates. There is a similar home for aged and infirm men at Bicêtre, and there are numerous institutions for the care of children and for the treatment of special diseases. The Assistance Publique expends annually about 40,000,000 francs on these hospitals and other allied charities.

The Hotel des Invalides was founded in 1670 by Louis XIV. as an asylum for his aged and disabled soldiers. With its high gilded dome, under which are the tombs of Napoleon, Turenne, Vauban, Jerome and Joseph Bonaparte and Marshal MacMahon, it is one of the most conspicuous monuments of Paris. The buildings, which cover about thirty acres, were begun in 1671, and completed in 1675. They furnish accommodation for 6,0000 inmates. The façade of this vast structure is 660 feet in length. It stands about 600 yards back from the Seine, facing the Esplanade des Invalides, a fine open place about 900 feet wide.

The Cemeteries.—There are more than twenty cemeteries in Paris, but at present much the greater number of interments are made in the newer cemeteries without the walls. There are, however, but three within the city of any considerable size or of much general interest. The largest and finest is Père Lachaise (*Cimetière de l' Est*), situated on a hill in the northeastern part of the city. It takes its name from Lachaise, the Jesuit confessor of Louis XIV., whose country seat formerly occupied the site. It dates only from 1804, and extends to but 110 acres. Next in interest is the cemetery of Montmartre (*Cimetière du Nord*), situated in the northern part of town not far from the Church of the Sacré Cœur. The cemetery of Montparnasse (*Cimetière du Sud*), on the left bank, dating from 1824, is the third in interest of the Parisian burying grounds. It is not far from the Gare Montparnasse. The little cemetery of Picpus, near the Place de la Nation, in the garden of an ancient convent, is of especial interest to Americans as containing the grave of Lafayette. There is a crematorium at Père Lachaise—the only one in Paris—with a columbarium in the Italian style as a depository for the ashes of the persons cremated there.

The Markets and Abattoirs.—The markets (*Halles Centrales*), of which the name and the location date from the foundation by Philippe Auguste in the 13th century, are vast structures, chiefly of iron, erected in 1874, consisting of twelve pavilions, between which run covered streets, forty-eight feet wide and forty-eight feet high, intersected by a boulevard 105 feet wide. The

six pavilions on either side of the boulevard occupy a space of 182 by 136 yards, the whole market covering an area of twenty-two acres. Each pavilion contains 250 stalls, and under each of the pavilions are cellars of similar area. In spite of their extent they are quite inadequate. In each arrondissement, there are, in addition to these central markets, one or more local markets of the same general character, under municipal control. The cattle market (*Marché de la Villette*), near the fortifications on the rue d'Allemagne, consists of three large pavilions, covering an area of ten acres. The central hall is capable of containing 4,600 oxen, the one on the right about 7,000 calves and pigs, and the one on the left 22,000 sheep. About 4,000,000 head of cattle annually enter the market. Near by and adjoining the cattle market are the slaughter houses (*Abattoirs de la Villette*), the buildings of which include twenty courts with 50 scalding-pans.

Prisons.—The Conciergerie, in which prisoners are lodged pending their trial, constitutes one of the prisons of Paris, of which the principal is La Force. The Nouveau Bicêtre is for convicts sentenced to penal servitude for life; St. Pélagie receives political offenders, St. Lazare is exclusively for women, the Madelonnettes for juvenile criminals, and Clichy for debtors.

Banks and Financial Institutions.—Chief among the financial institutions of Paris are the Bank of France and the three great private banks, the Crédit Lyonnais, the Comptoir National d'Escompte, and the Société Générale. The banking business of the city is largely in the hands of these four institutions. The Crédit Lyonnais has a sumptuous banking house in the boulevard des Italiens, a capital of 250,000,000 francs, a surplus of 100,000,000 francs, and real estate of the value of 37,000,000 francs, with deposits of about 1,656,000 francs. It has thirty-five branches in Paris and the suburbs, 140 branches throughout France, and seventeen branches in foreign countries, including two in London. The Comptoir National d'Escompte has a capital of 150,000,000 francs, thirty-nine branches in Paris and the suburbs, ninety-eight throughout France, and nineteen abroad. The Société Générale has a capital of 300,000,000 francs, seventy-two branches in Paris and the suburbs, 306 throughout France, and one in London. These three institutions, with aggregate capital exceeding $170,000,000, thus furnish Paris about 150 banks, with 550 branches in France and forty abroad. There are, of course, many other smaller banking institutions in Paris. The Bank of France, like the Bank of England, is a private joint-stock bank, and not an institution of the state. It has, however, the sole right to issue bank-notes which are guaranteed by the state. The idea of a Bank of France originated with Francis I., who established, in 1543, at Lyons, the first national bank. But the bank in its present form was organized

in February 1803 by the First Consul, with a capital of 30,000,000 francs, which has since been increased from time to time, until it is now 182,500,000 francs. The limit of note issue fixed by the government is 4,000 millions of francs, or about $800,000,000. This limit was increased in 1906 to 5,800 millions of francs. The gold and silver treasure of the bank are about 4,850 millions of francs, which amounts to the stupendous sum of $950,000,000. The bank has 125 branches throughout France. The chief office is in the rue de la Vrillière, in the old hotel Vrillière, to which extensive additions have been made from time to time. See BANK—BANKING; FRANCE—BANKING.

The Bourse was founded in 1734, but the Change de Paris, out of which the Bourse grew, has a history running back to the first years of the fourteenth century (1304 A.D.). The present Bourse or stock exchange building was begun in 1808, when Napoleon laid the cornerstone. It was completed in 1826 and opened by Charles X. The Palais de la Bourse, as it is called, is a handsome building, in the Græco-Roman style, surrounded by a series of 82 Corinthian columns, 33 feet high and 3½ feet in diameter. The length (exterior) is 225 feet; the width, including the new wings, 215 feet; and the height 100 feet. The hall is 105 by 57 feet, with wings on either side in the recent addition, about 40 by 60 feet each in size. The Bourse stands in a block by itself, facing the fine Place de la Bourse, which is about midway between the boulevard Montmartre and the Bank of France. While there are 1,100 seats in the New York stock exchange, and nearly 5,000 jobbers and brokers on the London stock exchange, there are only 70 memberships in the Bourse. They are, therefore, more valuable than memberships in any other exchange in the world, being worth at present from $350,000 to $500,000. The position of *agent de change* is a quasi-governmental one, the appointment to the office being by the minister of finance, and the operations of the Bourse being, at least indirectly, under the control of the state. The membership is a life estate, which can be disposed of by will to a son or nephew only, and that subject to governmental approval. The annual amount of business transacted is estimated at 100 milliards of francs, or $20,000,000,000.

The Crédit Foncier is a financial institution of enormous resources—quasi-governmental in character—organized in 1852, for the purpose of lending money, primarily on the security of real estate. It is said to be one of the fundamental institutions of public credit in France, and is of great service to the communes in advancing them money on public works. *La Coulisse*, a sort of loose association of unlicensed *agents*, whose transactions are purely speculative and carried on during business hours, corresponds in a way to the 'Curb' of the New York Stock Exchange. *La Petite Bourse*, a some-

what similar organization, carries on speculative transactions in the daytime, before and after the hours of the Bourse. *La Bourse du Soir* is the name for a group or groups of speculators who meet and trade or speculate in the evening.

The Mint (*Hotel des Monnaies*) is a large and handsome building on the Quai de Conti east of the Institute, erected in 1771-5. The façade is 400 feet long. Aside from the French coinage, which in amount is the largest in the world, these ateliers coin much money for other countries, and also many medals of all sorts. The assaying and stamping of the gold and silverware of the jewelers is also done here. There is a museum (*Musée Monétaire*) in connection with the Mint, which contains a very complete collection of French coins, and also many foreign coins.

Government.—The administration of the city is shared between the Prefect of the Seine, appointed by the Minister of the Interior, and the Municipal Council elected for a term of three years—one from each *quartier*—by universal suffrage. The annual budget runs to 375 or 400 millions of francs. The city is divided into twenty arrondissements, in each of which there is a mayor and a mairie, which is the office of the mayor, and constitutes a sort of city-hall for the arrondissement. Each of the arrondissements is divided into *quartiers* corresponding roughly to the wards of an American city. With twenty arrondissements there are eighty of these *quartiers*, each one of which has a distinguishing name, as for example, the quarter of the Champs-Elysées in the eighth arrondissement, or the quarter of the Sarbonne in the fifth arrondissement. These quarters are in general about the same territorial extent, but the population varies greatly between about 10,000 and 110,000.

At the head of the judicial system of Paris is the Minister of Justice and Religion. He conserves the ancient title of *Garde des Sceaux*. The Ministry of Justice is in the Place Vendome. The *Conseil d'Etat*, with forty-five members, which in some of its functions is a tribunal, and the *Cour des Comptes*, with eighty-four members, are at the Palais Royal; but all the other general courts are on the island, at the Palais de Justice or the Tribunal de Commerce. First of the courts is the *Cour de Cassation*, with forty-five judges, divided into three chambers. Next comes the *Cour d'Appel*, with sixty-two judges, divided into nine chambers. Then there is the tribunal of first instance, with seventy judges, divided into twelve chambers. These are the three superior tribunals of both civil and criminal jurisdiction. The *Tribunal de Simple Police*, a general court for petty offenses, sits also at the Palais de Justice; it is held by the *Juges de Paix*, sitting in rotation for short terms. The *Tribunal de Commerce*, a commercial court, with twenty-one judges, has its seat

at the Tribunal de Commerce. There is also in each of the twenty arrondissements a civil court (*Justice de Paix*) of inferior jurisdiction, and in each of the eighty *quartiers* a criminal court (*Commissariat de Police*) of limited jurisdiction. The jurisdiction of each of these courts is roughly suggested by their names. The tribunal of first instance is the ordinary court of general jurisdiction, from which there is an appeal to the *Cour d'Appel*, and thence in certain cases to the *Cour de Cassation*. Commercial cases, however, between merchants and traders, are heard by the *Tribunal de Commerce*, which has exclusive jurisdiction in that class of cases. There are no juries in civil cases, and in criminal cases a majority verdict of the jury suffices.

History.—The earliest notice of Paris occurs in Julius Cæsar's *Commentaries*, in which it is described (first half of B.C. 1st century) under the name Lutetia, as a collection of mud huts, composing the chief settlement of the Parisii, a Gallic tribe, conquered by the Romans. The ruins of the Palatium Thermarum (Palais des Thermes), and of ancient altars, aqueducts, and other buildings, show that even in Roman times the town extended to both banks of the Seine. Lutetia began in the fourth century to be known as Parisia, or Paris, from the Celtic tribe of the Parisii, to whom it belonged. In the 6th century, Paris was chosen by Clovis as the seat of government; and after having fallen into decay under the Carlovingian kings, in whose time it suffered severely from frequent invasions of the Northmen, it finally became in the 10th century the residence of Hugh Capet, founder of the Capetian dynasty, and the capital of the Frankish monarchy. From this period Paris continued rapidly to increase, and in two centuries it had doubled in size and population. In the middle ages Paris was divided into three distinct parts—La Cité, on the islands; the Ville, on the right bank; and the Quartier Latin, or University, on the left bank of the river. Louis XI. (reigned 1461-83) did much to enlarge Paris and to efface the disastrous results of its hostile occupation by the English during the wars under Henry V. and Henry VI. of England; but its progress was again checked during the wars of the last of the Valois, when the city had to sustain several sieges. On the accession of Henri IV. of Navarre 1589, a new era was opened to Paris. The improvements begun under his reign were continued under the minority (1601-22) of his son, Louis XIII. Louis XIV. (reigned 1643-1715) converted the old ramparts into public walks or *boulevards*, organized a regular system of police, established drainage and sewerage works, founded hospitals, almshouses, public schools, scientific societies, and a library, and thus gave to Paris a claim to be regarded as the focus of European civilization. The terrible days of the Revolution (1789-94) caused a temporary reaction. The improvement of Paris was

recommenced on a new and grander scale under the first Napoleon (from about 1804), when new quays, bridges, markets, streets, squares, and public gardens were created. All the treasures of art and science which conquest placed in his power were applied to the embellishment of Paris, in the restoration of which he spent more than $20,000,000 in twelve years. His downfall, 1815, again arrested progress, and in many respects Paris fell behind other European cities.

Renovation of various sorts was recommenced under Louis-Philippe (reigned 1830-48); but as lately as 1834, much of the old style remained; the gutters were in the middle of the streets, there was little underground drainage from the houses, oil-lamps were suspended on cords over the middle of the thoroughfares, and, except in one or two streets, there were no side-pavements. It was reserved for Napoleon III. (reigned 1852-70) to render Paris the most commodious, splendid, and beautiful of modern cities. When he commenced his improvements, Paris still consisted, in the main, of a labyrinth of narrow, dark, and ill-ventilated streets. He resolved to pierce broad and straight thoroughfares through the midst of these, to preserve and connect all the finest existing squares and boulevards; and in lieu of the old houses pulled down in the heart of the town, to construct, in a ring outside of it, a new city in the most approved style of modern architecture. With the assistance of Baron Haussman, prefect of the Seine, his schemes were carried out with rare energy and good taste. Two straight and wide thoroughfares, parallel to and near each other, crossed the whole width of Paris from north to south, through the Cité; a still greater thoroughfare was opened from east to west through the whole length of the town north of the Seine. The old boulevards were completed so as to form outer and inner circles of spacious streets—the former lying chiefly along the outskirts of the old city, the latter passing through and connecting a long line of distant suburbs. In 1867, when the international exhibition was opened, Paris had become in all respects the most splendid city in Europe. Many further improvements were then contemplated. New botanical and zoological gardens were to be formed; the museums and class-rooms of the Jardin des Plantes were to be rebuilt; an underground railway was to be formed, crossing Paris from east to west; Montmartre was to be levelled, and the Seine was to be deepened up to Grenelle, the point where it leaves the town; and there a harbor was to be formed for sea-going ships, which was to convert Paris into a seaport. Financial and political difficulties were, however, at hand (see FRANCE), and these great schemes had to be postponed. The siege of Paris by the Germans, 1870–71, caused much less injury to the city than might have been expected; it was reserved for a section of the Parisian population to commit an act of vandalism

without parallel in modern times. On March 18, the Red Republicans, who had risen against the government, took possession of Paris, March 27, the Commune was declared the only lawful government. Acts of pillage and wanton destruction followed. May 15 the column erected to the memory of Napoleon and the Great Army, in the Place Vendôme, one of the principal squares of Paris, was solemnly pulled down as 'a monument of tyranny.' The government troops under Marshal MacMahon attacked the insurgents, and kept them from further mischief. The former succeeded in entering Paris May 20, and next day the Communists began systematically to set fire with petroleum to a great number of the chief buildings of Paris, public and private. The fire for a time threatened to destroy the whole city. It raged with the greatest fury on the 24th, and was not checked until property had been lost to the value of tens of millions of dollars, and historical monuments destroyed which never can be replaced. The horror inspired by the Commune for a time drove the wealthy classes from Paris, and it was feared that it would lose its prestige as a European capital. This result, however, has been in great degree averted. In the autumn of 1873, all the private houses burnt had been rebuilt—the monuments only partially injured had been restored, and the streets and public places were as splendid and gay as in the best days of the empire. There remained, however, to recall the Commune, the blackened ruins of the Tuileries, the Hôtel de Ville and two or three other buildings. The chief events in the subsequent history of Paris were the International Expositions of 1878, 1879, and 1900; the discovery of the remains of Commodore Paul Jones in the spring of 1905 by Horace Porter, American ambassador to France; the rupture between France and the Vatican in 1904, and the promulgation of the church and State Separation Law in December 1905 (see FRANCE, *History*); and the acquittal of Major Dreyfus (q.v.) in 1906, and the attempt on his life 1907, June 4, at the canonization services of Emile Zola; and the destruction by fire on Sept. 20, 1908, of the central telephone exchange, involving a loss of about $2,000,000.

Bibliography.—Among the immense number of books, historical and illustrative, concerning Paris, the following, mainly French and American works, will be found especially valuable: Labedolière, *Le Nouveau Paris* (1871); Martin, *The Stones of Paris* (1899); Haynie, *Paris Past and Present* (1902); Lansdale, *Paris, Its Sites, Monuments, and History* (1899—an accurate and very readable work); Robinson, *Modern Civic Art* (1903); *Memorable Paris Houses* (1888); *Paris and Its Story* (1904); Hilaire Belloc, *Paris* (1904; Kaufmann, *Paris of To-day* (1891); Victor Hugo, *Paris, Les Miserables,* and *Notre-Dame de Paris;* Eugène Sue, *Mysteries of Paris;* the *Opera of Louise.* The Guides of

Joanne and Baedeker to Paris and its environs (the former in French and the latter in English) are mines of accurate information.

PARIS, DECLARATION OF: in international law, an agreement made in 1856, at a meeting of the representatives of the great powers held in Paris. Four points were established, namely, (1) Privateering is abolished; (2) the neutral flag covers enemies' goods, excepting contraband of war: (3) neutral goods, with the same exception, are not liable to be seized even under an enemy's flag; (4) blockades, in order to be binding, must be effective. The United States refused to accept the first point, because the European Powers declined to affirm that private property should be exempted from capture by ships of war. See NEUTRALITY.

PARIS, TREATIES OF. Many treaties between France and other nations are known under the title Treaty of Paris. The more important of these were the following: One concluded 1903, May 20, between France and England, had for its object the restoration of Aquitaine to Edward I. A treaty of peace was signed 1763, Feb. 10, between France, Spain, Portugal, and England, and by the same treaty Canada was ceded to Great Britain. On 1778, Feb. 6, was signed that between France and the United States, in which the independence of the latter country was recognized. By another, signed 1796, May 15, between the French Republic and the King of Sardinia, Savoy and Nice were ceded to France. One ratified 1807, Nov. 10, between France and Holland, had for its object the cession of Flushing to the former country. Other treaties are: that between Napoleon I. and the allies, ratified 1814, April 11, by which Napoleon was deposed and banished to Elba; the convention betwen Count d'Artois and the allies for the cessation of hostilities and evacuation of France, signed 1814, April 23; the convention of 1815, Aug. 2, between Great Britain, Austria, Russia, and Prussia, entrusting the charge of Napoleon to the British government; the treaty between France and the other great European powers, ratified 1815, Nov. 20, in which the boundaries of France were defined, and provision made for the temporary garrisoning of French fortresses; that between France and Portugal for the cession of Guiana to France, concluded 1817, Aug. 28; that for the conclusion of peace between Russia on the one hand, and France, Austria, Turkey, and Great Britain on the other, ratified 1856, March 30; the treaty of 1857, May 26, between the great powers of Europe with regard to Neuchâtel; the convention constituting the Danubian Principalities, 1858; and the treaty of peace with Germany, concluded 1871, May 10.

The Spanish-American war of 1898 was terminated 1898, Dec. 10, by the Treaty of Paris, by the terms of which Spain ceded the Philippine Islands, Guam, and Porto Rica (q.q.v.) to the United States which paid her $20,000,000, and also relinquished her control over Cuba (q.v.).

PA'RIS, genus of plants of the small endogenous or dictyogenous nat. order *Trilliaceæ*, of which one species, *P. quadrifolia*, called HERB PARIS, is common in moist shady woods in parts of Britain. It is rarely more than a ft. high, with one whorl of generally four leaves, and a solitary flower on the top of the stem, followed by a berry. The berry is reputed narcotic and poisonous, but its juice has been employed to cure inflammation of the eyes. The root has been used as an emetic.

PARIS, *păr'ĭs*, called also ALEXAN'DER: legendary Trojan hero, appearing in Homer as the second son of Priam and Hecabe, sovereigns of Troy. His mother dreamed during her pregnancy that she gave birth to a firebrand, which set the whole city on fire, a dream interpreted by Æsacus or Cassandra to signify that P. was to originate a war ending in the destruction of his native city. To prevent its realization, Priam caused the infant to be exposed upon Mount Ida by a shepherd named Agelaus, who found him, five days afterward, alive and well, a she-bear having given him suck. Agelaus brought him up as his own son, and he became a shepherd on Mount Ida, distinguishing himself by his valor in protecting the other shepherds from their enemies—whence his name, Alexander, 'defender of men.' An accident having revealed his parentage, old Priam became reconciled to his son, who married Œnone, daughter of the river-god Cebren. Nevertheless his mother's dream was to come true. He was appealed to, as umpire, in a strife which had arisen among the three goddesses, Hera (Juno), Athene (Minerva), and Aphrodite (Venus), as to which of them was the most beautiful, the goddess Eris (Strife) having revengefully flung among them, at a feast to which she had not been invited, a golden apple (of discord) inscribed *To the Most Beautiful*. Each of the three endeavored to bribe Paris. Hera promised him dominion over Asia and wealth; Athene, military renown and wisdom; Aphrodite, the fairest of women for his wife—to wit, Helene, wife of the Lacedæmonian king, Menelaus. P. decided in favor of Aphrodite, hence the animosity which the other two goddesses displayed against the Trojans in the war that followed. P. proceeded to seek Helene, whom he carried away from Lacedæmon in her husband's absence. 'The rape of Helen' is the legendary cause of the Trojan war, on account of which P. incurred the hatred of his countrymen. He deceitfully slew Achilles in the temple of Apollo. He was himself wounded by a poisoned arrow, and went to Mount Ida to be cured by Œnone, who possessed great powers of healing; but she avenged herself for his unfaithfulness to her by refusing to assist him, and he returned to Troy, and died. He was often represented in ancient works of art, generally as a beardless youth, of somewhat effeminate beauty.

PARIS, *păr'is*, F. *pâ-rē'*, Louis Philippe Albert d'Orleans, Comte de: 1838, Aug. 24—1894, Sep. 8: son of the late Duc d'Orleans, and grandson of the former king, Louis Philippe. When 4 years of age he lost his father, and 6 years later on the outbreak of the revolution, fled from Paris with his mother and brother. His education was continued in England and Germany under the oversight of his mother. After her death, 1858, he travelled in the East; and with his brother and an uncle, Prince de Joinville, came to the United States 1861. In the civil war the brothers served for 10 months on the staff of Gen. McClellan. The Comte de Paris and his cousin, Princess Marie Isabelle, eldest daughter of the Duc de Montpensier, were married 1864. During the 'cotton famine' in England he investigated the condition of the mill operatives, and afterward published *Workingmen's Associations in England* (1869). This was followed by political books, and a *History of the Civil War in America* (6 vols. 1874–84), which is regarded as a standard work. He was allowed to return to France, became a member of the national assembly 1871, and on the death of the Comte de Chambord 1883 he became the recognized head of the royal house. He was exiled 1886, retired to England, and 1887 issued a call to the French people to overthrow the republic and re-establish a monarchy. He gave his influence to the cause of Gen. Boulanger 1889, and visited the United States and Canada 1890, October.

PAR'IS, Matthew of: the best Latin chronicler of the 13th c., and one of the most important writers in connection with Eng. mediæval history: b. about 1195; d. after 1259, May. His origin was doubtless English; he may have been born in Paris, or studied in the univ. there—whence his surname. He entered the Eng. Benedictine monastery of St. Albans 1217, Jan. 21. After the departure of Roger of Wendover, 1235, Matthew was chosen to succeed him as annalist of the monastery. He discharged his functions with a veracity and boldness, which greatly displeased some of his contemporaries. The principal external incident of his life was his voyage to Norway, whither he was invited by King Hakon, to repair the financial disorders in the Benedictine monastery of Holm. P. landed at Bergen 1248, July 10; and settled the business about which he came. After his return to England, he stood high in the favor of Henry III., who used to converse with him in the most familiar manner, and from whose lips he derived not a little of the information that makes his *Chronicle* so valuable. He had also a wide circle of friends and acquaintances among the clergy, from whom he obtained materials for his work. P. had great repute in his day for virtues and abilities. He was considered a universal scholar. He was a patriotic Englishman, and though a sincere Catholic (like all good men of his age), yet he wrote so fiercely against the encroachments of the court of Rome in ecclesiastical matters. that his *Chronicle* be-

came, in after times, a great favorite with the Reformers P.'s principal work is his *Historia Major*, which begins with the Norman Conquest, and extends to the year of the author's death. It was continued by William Rishanger, also a monk of St. Albans, till the death of Henry III. 1272. The first ed. was published at London by Abp. Parker 1571, and was reproduced at Zürich 1606; later and more complete editions are those of London 1640–1, and 1684. The only portion of the *Historia Major*, however, properly the work of P., is that 1235–59; the previous part being nearly a transcription from the *Flores Historiarum*, attributed to Roger of Wendover, whence some critics have supposed that P. is really the author of that work too. But this opinion is strenuously contested by the most recent editor of the *Flores Historiarum*, the Rev. H. O. Coxe (4 vols. 1841–2). Translations both of P.'s *Chronicle* and that of Roger of Wendover have been published by Bohn in his Antiquarian Library. The British Museum, and the library of Corpus Christi College at Cambridge, contain MS. abridgments of the *Historia Major*, by P. himself, entitled *Chronica Maiora Sancte Albani;* a second abridgment is known as the *Historia Minor*. Other works of P.'s are *Duorum Offarum Merciorum Regum Vitæ; Viginti trium Abbatum, S. Albani Vitæ;* and *Additamenta*, being explanatory additions to his *Historia Major*.

PAR'IS, Plaster of: see Gypsum.

PAR'IS BA'SIN: collective name of the beds of Eocene age, which rest in a hollow of the chalk in the district around Paris, where they occupy an oblong area 180 m. in greatest length n. to s., and 90 m. in breadth from e. to west. For the different sections into which the series has been divided, see Eocene. The beds are remarkable chiefly for the treasure of organic remains which they supplied to Cuvier, and which led to the foundation of the modern science of Paleontology. The strata from which principally these were obtained consist of a series of white and green marls with subordinate beds of gypsum; they are largely developed at Montmartre, where the gypsum has been extensively quarried for manufacture of plaster of Paris. The fossils comprise land and fluviatile shells, fresh-water fish and crocodiles, and the bones of birds and quadrupeds, besides a few land-plants, including some palms. The mammals, of which about 50 species have been described, belong to the order Pachydermata. The P. B. has for some time almost ceased to supply the remains of vertebrate animals.

PAR'IS GREEN: see Insecticides: Arsenious Acid

PARISH, n. *păr'ĭsh* [F. *paroisse*—from mid. L. *parœcĭă*; Gr. *paroi'kĭă*, an ecclesiastical district or neighborhood: Gr. *paroikos*, dwelling beside another—from *para*, by, near; *oikos*, a house]: term denoting the congregation, with the territory often vaguely defined, pertaining to a local church. In La. the term denotes what is known in the other states as a county. In Britain, an ecclesiastical division of a town, etc., subject to the oversight and ministry of one pastor. Besides these ecclesiastical parishes there are in Britain also civic parishes; such a parish is a district having its own offices for the legal care of the poor, etc. (see below). PARISH, a. pertaining to a parish; maintained by a parish. PARISH-CLERK, in England, official whose duty is to lead the responses during the reading of the service in the parish church. He is appointed by the parson, unless some other custom of a peculiar kind exists in the parish. He must be 20 years of age, and has his office for life, but is removable by the parson for sufficient cause. A person in holy orders may be elected P.-clerk. Under some of the church building acts governing the new churches built in populous parishes, he is annually appointed by the minister. The salary of the P.-clerk is paid out of the church rate. PARISHIONER, n. *pă-rĭsh'ŭn-ẽr*, a native or an inhabitant of a parish.—A *Parish* is the district assigned to a particular church, where the inhabitants of the district may attend public worship, and receive the sacramental or other ministrations of the clergy. The name seems originally to have designated the first Christian congregations, which, being formed in the cities, became centres around which rural congregations were formed—these congregations dependent on the metropolitan one, and becoming included as part of its parish. Thus the word gradually came to be applied to the districts subject to the spiritual jurisdiction of a bishop; and on the other hand, at a later period, *diœcesis* was sometimes used to signify a parochial church or district. The distribution into strictly defined parishes appears to have grown up gradually, at dates differing in different lands. In the city of Rome there were 40 parish churches before the close of the 3d c.; parishes are found in France early in the 5th c.; the earliest trace in England is about 970. The Episcopalian view is that originally all the clergy were but coadjutors of their bishop, and served in his church, at which all the faithful assembled. At Alexandria, and afterward at Rome, a number of minor churches were opened (called at Rome *tituli*), served by clergy, in the earliest period not permanently attached to them, but sent from the principal or bishop's church, but in progress of time fixed permanently in the charge. This, however, was not common; and we find churches with clergy permanently attached, much earlier in rural districts than in cities. The institution does not appear to have become general till the 9th or 10th c. In England, the first legislation on the subject occurs in the

laws of Edgar, about 970. The parochial division of districts seems in great measure to have followed the civil distribution into manors, or other feudal divisions of territory; and it is probable that to the same state of things is due the practice of lay patronage, the priest officiating in a manorial church being chosen, with the bishop's consent, by the lord of the manor. The parochial revenue, however, did not follow the rules which now prevail. At first, all ecclesiastical income, from whatever district, was carried into a common fund, which was placed at the disposal of the bishop, and was generally divided into four parts—for the bishop, for the clergy, for the poor, and for the church. By degrees, however, beginning with the rural parishes, and ultimately extending to those of the cities, the parochial revenues were placed at the disposal of the parish clergy (subject to a similar general threefold division, for the clergy, for the poor, and for the church); and in some places an abusive claim, which was early reprobated, arose on the part of the lord of the manor to a portion of the revenue. Properly, a P. has but one church; but when the district is extensive, one or more minor (*succursal*) churches, sometimes called 'chapels of ease,' are permitted.

In the law of England, a P. is an important subdivision of the country, for purposes of local self-govt., most of the local rates and taxes being confined within that area, and to a certain extent self-imposed by the parties who pay them. The origin of the division of England into parishes is not clearly ascertained from the authorities. Some have asserted that the division had an ecclesiastical origin, and that a P. was merely a district sufficient for one priest to attend to. But others have asserted that parishes had a civil origin long anterior to ecclesiastical distinctions, advantage being merely taken to ingraft these on so convenient an existing subdivision of the country; and that a P. was a subdivision of the ancient hundred, known as a vill or town, and through its machinery the public taxes were anciently collected. (See PATRONAGE, ECCLESIASTICAL.) Hobart fixes the date of the institution of civil parishes in 1179, and his account has been generally followed. Much difficulty has occasionally arisen in fixing the boundaries of parishes. Blackstone says the boundaries of parishes were originally ascertained by those of manors, and that it very seldom happened that a manor extended over more parishes than one, though there were often many manors in one parish. Nevertheless, the boundaries of parishes are often intermixed, which Blackstone accounts for by the practice of the lords of adjoining manors obliging their tenants to appropriate their tithes toward the officiating minister of the church, which was built for the whole. Even in the present day, these boundaries often give rise to litigation, and the courts have always decided the question according to the proof of custom. This custom is established chiefly by the

ancient practice of perambulating the parish in Rogation-week in each year: see PERAMBULATION OF PARISHES.

One of the chief characteristics of a P. is, that there is a parish church, with an incumbent and churchwardens attached, and by this machinery the spiritual wants of the parishioners are attended to. These several P. churches, and the endowments connected therewith, belong to the nation, and the incumbents are members of the Established Church of England, and amenable to the discipline of the bishops and the spiritual courts. The private patronage, or right of presenting a clergyman to an incumbency, technically called an Advowson (q.v.), is generally held by an individual as a saleable property, having a market value. The patron has an absolute right (quite irrespective of the wishes of the parishioners) to present a clerk or ordained priest of the Church of England to a vacant benefice, and it is for the bishop to see to his qualifications. The bishop is the sole judge of these qualifications; and if he approves of them, the clerk or priest is instituted and inducted into the benefice, which ceremony completes his legal title to the fruits of the benefice. The incumbents of P. churches are called rectors, or vicars, or perpetual curates, the distinction being founded chiefly on the state of the tithes. When the benefice is full, then the freehold of the church vests in the rector or parson, and so does the churchyard; but he holds these only as trustee for use of the parishioners. There are certain duties which the incumbent of the P. church is bound by law to perform for the benefit of the parishioners. He is bound, as a general rule, to reside in the parish, so as to be ready to administer the rites of the church to them: see NON-RESIDENCE. The first duty of the incumbent is to perform public worship in the P. church every Sunday, according to the form prescribed by the Book of Common Prayer, which is part of the statute-law of England. He must adhere strictly to the forms and ceremonies and even to the dress prescribed by the Book of Common Prayer and Canons. The incumbent is bound also to baptize the children of all the parishioners, and to administer the rite of the Lord's Supper to the parishioners not less than three times each year. The incumbent is bound also to allow the parishioners to be buried in the churchyard of the P., if there is accommodation, and to read the burial-service at each interment. He is bound also to marry the parishioners on their tendering themselves, and complying with the marriage acts, within the P. church during canonical hours; and it is said that he is liable to action for damages if he refuse. Fees are frequently payable by custom for marriages and burials; but unless such custom exists, no fee is exigible. Another incident of the P. church is, that there must be churchwardens appointed annually—who are accordingly leading parochial officers—whose duty is partly ecclesiastical and partly civil.

Their civil duties consist chiefly in this, that they must join the overseers in many of the duties arising out of the management of the poor, and incidental duties imposed by statute: but their primary duty is to attend to the repair and good order of the fabric of the church. The common law requires that there should be two churchwardens, one of whom is appointed by the incumbent, and the other is chosen by the parishioners in vestry assembled, but sometimes this rule is varied by local custom. This appointment and election take place in Easter-week of each year. In electing the people's churchwarden, there is often much local excitement; and it is common to poll the parish, all those who pay poor-rates being entitled to vote, the number of votes varying according to the rent, but no person having more than six votes: see CHURCH-WARDEN: CHURCH RATES.

The next most important business connected with the P. is that which concerns the poor, the leading principle being, that each union is bound to pay the expense of relieving its own poor: see OVERSEERS: GUARDIAN: POOR.

Another important feature of the P. is, that all the highways within the parish must be kept in repair by the P., i.e., by the inhabitants who are rated to the poor. For this purpose, the inhabitants of each P., in vestry assembled, appoint each year a surveyor of highways, whose duty it is to see that the highways are kept in good repair; and he is authorized, by the General Highway Act, to levy a rate on all the property within the parish. The office of a surveyor of highways is compulsory and gratuitous, like those of churchwarden, overseer, and guardian. The late Highway District Acts, passed first 1862, enable the justices of the peace of the district to combine several parishes into one district, in order to secure more uniformity in the repairs of the highways.

The above duties in reference to the P. church, the poor, and the highways, are the leading duties attaching to the P. as a parish; but besides these, many miscellaneous duties have been imposed on the P. officers, particularly on the overseers and churchwardens: see OVERSEERS. In nearly all cases where the P., as a parish, is required to act, the mode in which it does so is by the machinery of a vestry. A vestry is a meeting of all the inhabitant householders rated to the poor. It is called by the churchwardens, and all questions are put to the vote. Any ratepayer who thinks the majority of those present do not represent the majority of all the parishioners is entitled to demand a poll. At these meetings, great excitement often prevails, especially when there are church rates. Wherever a P. improvement is found desirable, the vestry may meet and decide whether it is to be proceeded with, in which case they have powers of rating themselves for the expense. Such is the case as to the establishment of baths and wash-houses, watch-

ing, and lighting. Returns are made of all parishes and local rates to parliament every year. The parish property, except the goods of the parish churches, which are vested in the churchwardens, is vested in the overseers, who hold and manage the same, requiring the consent of the Poor-law Board in order to sell it. For the elementary education system, and for school-boards as local authorities of districts (not necessarily parishes), see EDUCATION, NATIONAL OR STATE.

In Scotland, the division into parishes has existed from the most ancient times, and is recognized for certain civil purposes relative to taxation and otherwise, as well as for purposes purely ecclesiastical. The court of session may unite two or more parishes into one; or may divide a parish, or disjoin part of it, with consent of the heritors (or landholders) of a major part of the valuation; or without their consent, if it be shown that there is within the disjoined part a sufficient place of worship, and if the titulars of Teinds (q.v.), or others who have to pass less than three-fourths of the additional stipend, do not object. By Act 7 and 8 Vict. c. 44, any district where there is an endowed church of the established Presb. order may be erected into a parish *quoad sacra*, for such purposes as are purely ecclesiastical. Endowed Gaelic congregations in the large towns of the Lowlands may similarly be erected into parishes *quoad sacra*. The principal application of the parochial division for civil purposes relates to the administration of the poor-law. The Board of Supervision may unite two or more parishes into a combination for poor-law purposes. There is not the same extensive machinery for parochial self-government as in England. The burden of supporting the fabric of the church falls on the heritors, and there are no churchwardens. Highways are not repairable by the parish, and there are no elections of surveyors or way-wardens. The meeting of the inhabitants in vestry, frequent in England, is unknown in Scotland; hence the ratepayers do not interest themselves so much in local affairs. Many of the duties which in England are discharged by parochial officers are in Scotland discharged by the sheriff-clerk, a county-officer. The system of having a Parish School (q.v.) in every parish (a system extended by the Education Act of 1872) has long prevailed in Scotland, though unknown in England till 1870.

PARISH SCHOOLS, CATHOLIC, IN THE UNITED STATES. The most impressive religious fact in the United States to-day is the system of free Catholic parish schools. Over 1,200,000 children are being educated in these schools. This great educational work is carried on without any financial aid from the state. The parish schools are maintained by the voluntary contributions of Catholics. For the Christian education of their children Catholics are making tremendous sacrifices that elicit the praise of all thoughtful Americans; and at

the same time they are saving to non-Catholic taxpayers a vast sum, estimated from $20,000,000 to $25,000,000 annually, for this is what it would cost if the children now being educated in the Catholic parish schools had to be provided for in the public schools.

The system of Catholic parish schools is now so perfectly organized and equipped, its efficiency as tested by practical results so well established, that few hesitate to acknowledge that it is not only an impressive but a permanent fact. The Catholic school is not an experiment; it is an assured success, and it has come to stay. There was a time when it was thought by some that the parish school could not live beside the public school. The latter had the attractions of fine buildings, ample playgrounds, well-paid teachers, all that public money—so generously provided by the state—could provide, while the former had up to within recent years poor buildings, little if any playgrounds, and scant means for carrying on its work. The success of the parish school is largely due to the devotion and self-sacrifice of the thousands of religious women and men—the members of teaching orders of the Church—who have consecrated their lives to Christian education. To these is due the present excellent condition of the free Catholic parish schools; without them it would be almost impossible for the system to succeed. The network of Catholic schools extending into every state and territory is, under the guidance of the Catholic bishops and priests, of their creation.

There never was a time in the history of the Church when elementary Christian schools of one kind or another did not exist. Even down in the catacombs we find next to the little chapel the school-room for the catechumens, where they had their own teachers, distinct from those who gave instruction to the faithful. All through the Middle Ages we find the primary, or what we call to-day parochial, schools everywhere.

The Catholic Church has always laid down the principle that secular and religious instruction shall never be parted in education. It has laid down and followed this principle from the beginning. It has laid down this principle not only for elementary schools, but for higher schools—colleges and universities. Education, it maintains, is the formation of the whole man—intellect, heart, will, character, mind, and soul. Whether it be the child of the American artisan in the parish school or the son of the millionaire in the university, it is all the same. The Catholic Church accepts as education nothing less than the formation of the whole man. It will never consent that its children shall be reared without the knowledge of their faith, or that education shall be so divorced that secular knowledge shall be made the subject of daily and earnest inculcation and that religion shall be left out, as an accident, to be picked up when and as it may. The Catholic Church holds that a Christian nation can only spring

from Christian schools, and that neither private zeal, nor home education, nor the Sunday school suffice to supply the Christian teaching and formation of character which she desires in her children. It is because of this settled conviction that at all costs and at great sacrifices she preserves here in the United States the unbroken and unimpaired tradition of Christian education from the parish school of the humble mission to the majestic colleges and academies and universities that it has built throughout the United States.

The Catholic Church from its first beginning in the United States has had parish schools. It is interesting to note that six years before the establishment of a public school in New York there was a Catholic free parish school —St. Peters, Barclay Street, in that city. Earlier still, in the middle of the 18th century, there were Catholic schools in Pennsylvania. In 1781 in Philadelphia an old school-house and lot were bought from the Quakers, and opened as a Catholic parish school in August, 1782. In the early days, however, these schools were few and rather poorly equipped. The buildings were not attractive and oftentimes unsuitable for school purposes. The basement of a church and sometimes the church itself was used as the school-house. There was a dearth of teachers in those early days, for the teaching religious communities were not yet widely established. The school was not always well graded, and too often it was overcrowded. The results, except that the religious faith of the children was preserved, were not entirely satisfactory. There was in certain quarters, too, a disposition on the part of parents to ignore the directions of the church and to send their children to the public schools. There was, moreover, a strong popular feeling against the parish school on the ground that it was un-American. Notwithstanding these difficulties—that the church was hampered for means, despite the popular outcry against such schools, and the dissatisfaction here and there of some Catholics—the parish school system went on extending itself into every diocese throughout the country.

When the Catholic bishops of the United States met in the third plenary council of Baltimore in 1884, one of the most important questions they had to discuss and legislate upon was the subject of parish schools. Laws and regulations for the establishment and management of these schools were laid down with great care and definiteness. In every parish, where it was possible, a parish school was to be established. Catholic parents were directed to send their children to these schools. The local rector was urged, as well as the teachers, to make these schools equal to the best. Courses of study were prescribed; there was to be a local superintendent appointed in each diocese; local school boards of competent laymen were to be selected; in fact, there was nothing to be left undone to effect a thorough organi-

zation of the whole parish school system. The rapid growth, the educational strength, and singular success of Catholic schools date from this decided action of the hierarchy.

As the result of this action of the Catholic hierarchy the parish school system began to extend itself very rapidly. In the New England dioceses the establishment of schools was especially marked; also in the dioceses of the West the development within a short time was very pronounced.

Within the last 30 years in the dioceses of New England Catholic educational institutions have multiplied threefold. To-day there are 400 such institutions as against 100 a quarter of a century ago, and 150,000 Catholic pupils in attendance at these schools as against 20,000 in 1875. In the archdiocese of Boston the Catholic schools almost equal in number those which were flourishing in the entire province 25 years ago; while the number of children in Catholic schools, colleges, and academies of the archdiocese far surpasses the total attendance of the Catholic schools of New England of 30 years ago.

In the archdiocese of New York there are almost 100,000 children in Catholic schools, while the parish schools of Philadelphia have an enrollment of 65,000. The same steady growth is witnessed in almost every diocese throughout the country.

To-day the Catholic educational system elicits the respect and earnest study of many eminent educators, and doubtless its continued development will do more than anything else to induce a fairminded and conciliatory attitude on the part of the public toward Catholic parish schools.

Special attention is given in Catholic schools to the study of the history of our country, and the spirit of patriotism is constantly inculcated. The great national holidays—Washington's birthday, Memorial and Thanksgiving days are duly observed on the afternoon of the preceding day with appropriate exercises by the pupils.

The management of the Catholic school ultimately rests with the rector of the parish. He is usually aided by a local committee or school board made up of competent laymen who are interested in educational matters. The third council of Baltimore suggested the appointment of such a body, and it has been found by experience that its services are most helpful. The members of the school committee visit the schools regularly; they inspect the building, are present at recitations, usually question the pupils, and in many other ways contribute to the efficiency of the school. The gentlemen who are selected for this position regard it as a special mark of honor and give their time and services cheerfully. They are a great aid to the pastor in his school-work. They meet, usually once a month, in conference with the rector, when the daily

works of the school are discussed and suggestions made for remedying any defects or for bettering conditions. The local management of the school receives great aid and valuable direction from the diocesan superintendent. He is usually a priest who is well up in educational matters and is set apart by the bishop for this work.

The teachers in the parochial schools are for the most part members of the various teaching orders of the Catholic Church. Of the schools represented in the Catholic Educational Exhibit at the World's Fair, Chicago, 1893, 97 per cent. of the schools were in charge of the various religious orders. Doubtless the same percentage would hold in the parochial schools of to-day. Many lay teachers are found in the German, Polish Slavish, and Italian schools, as well as in the parish schools conducted in small towns or rural districts where it is not possible to maintain a religious community. The parochial school-teacher devotes his or her whole life to teaching. And thus the religious teacher has, in this respect, a decided advantage over those teachers who occupy themselves with the important duties of teaching until something more lucrative or attractive is found. The child's future welfare is always the first and great consideration with these religious teachers. No one is admitted to undertake the responsibilities of a teacher who is not fully qualified for the work.

In most dioceses there are examining boards for the parochial school-teachers. To-day normal schools exist in all the novitiates of the religious teaching communities. The Catholic idea of the ideal teacher is one in whom moral character, intellectual training, and professional skill cooperate in harmonious action for the success of the class and the individual pupil; one who day by day becomes the better teacher precisely because day by day he or she become a more diligent student, a more successful solver of the pedagogical or psychological problems that present themselves within the realm of the class-room.

To secure such ideal teachers, or at least to make the combination of necessary qualities less rare, is supposedly the end aimed at in normal school teaching.

The religious teaching communities justly claim to have been the first to establish normal schools for teachers, though from some of the histories of education, or from the data advanced by lecturers of schools of pedagogy, one would never be led to suspect the fact.

Dr. N. C. Schaeffer, superintendent of public instructon in the state of Pennsylvania, in his 69th annual report, referring to this subject, writes:

"The sisters in charge of the parochial schools of the Catholic Church spend the greater part of their vacation in some form of preparation for the year's work. Even at the annual retreats time is given to self-examination as a lever to raise the individual to

higher planes of effort. The best scholars in the Jesuit and other colleges deliver lectures to fit teachers for work in the elementary schools. What the church does for her teachers the state can afford to do for its teachers."

It may be well also to note that the Catholic University of America opened an institute of pedagogy in New York City on Oct. 1, 1902. The instruction treats of the history of education, the principles and methods of education, psychology, American history, and literary work. There is at present a very thorough organization of the free Catholic parish school system; it is well equipped to carry on its work, and steps are being constantly taken to advance it still further.

Those who are at the head of the system, the Catholic hierarchy, local directors and superintendents, are among the foremost and most progressive educators in the United States.

PARISIAN, n. *pă-rĭz'ĭ-ăn:* a native or inhabitant of the city of Paris.

PARISYLLABIC, a. *păr'ĭ-sĭl-lăb'ĭk* [L. *par* or *parem*, equal; *syl'laba*, a syllable]: having an equal number of syllables in all its inflections.

PARITOR, n. *păr'ĭ-tŏr* [mid. L. *parĭtor*, a servant—contr. from *apparĭtor*]: a summoner of the courts of civil law.

PARITY, n. *păr'ĭ-tĭ* [F. *parité;* L. *parĭtas*, equality—from *par*, equal: It. *parita*]: the condition of being equal or equivalent; equality; close resemblance; analogy.

PARK, n. *pârk* [F. *parc*, an inclosure—from mid. L. *parcus:* Dan. *park;* It. *parco;* AS. *pearroc;* Ger. *pfereh;* Gael. *páire*, a park, an inclosure]: inclosed or assigned portion of land, in or near a town, for public use and for amusement or exercise: lawn, woodlawn, and pasturage around a mansion, so far as pleasure-walks or drives extend.—In the United States, the name is applied also to great reservations including remarkable scenery or natural objects, reserved for public resort. In *milit.*, the train of heavy artillery, with horses, carriages, equipment, ammunition, etc., which accompanies an army to the field: it is placed where rapid access can be had to the line of the army in any part, and where the divisions of the force can easily mass for its protection. The horses of the park are picked in lines in its rear. Also, the term *Park* is applied sometimes to the whole collection of tools, etc., belonging to the engineer department of the army. PARK, v. to inclose, as a park; to bring into a compact body, as artillery. PARK'ING, imp. PARKED, pp. *pârkt. Note.*—PADDOCK is related to PARK through OE. *parrok*, AS. *pearroc*, a park, of either of which PADDOCK is a mere corruption.

PARK.

PARK, *pârk*, EDWARDS AMASA, D.D., LL.D.: theologian: b. Providence, R. I., 1808, Dec. 20; d. Andover, Mass., 1900, June 4. He graduated from Brown Univ. 1826, and from Andover Theo. Seminary 1831, and was then settled for about two years over a Congl. church in Braintree, Mass. After being professor of mental and moral philosophy and Hebrew literature at Amherst College 1835–6, he became professor of sacred rhetoric in the theol. seminary at Andover, and 1847 professor of Christian theology in the same institution. This chair he retained till 1881, when he retired from active service, but was made professor emeritus. He was a strong advocate of the system known as the New England Theology. When 20 years of age he commenced writing for religious periodicals, and he has been a voluminous contributor to this class of journals. In connection with Prof. Bela B. Edwards, he started the *Biblotheca Sacra* 1844, acting as associate editor till 1851 and as editor-in-chief 1851–84, making an unbroken editorial connection of 40 years with this important publication, which then held the rank of the leading theological publication in this country. He published in pamphlet form memoirs of many eminent men, including Moses Stuart and Bela B. Edwards, of Andover Seminary; the Rev. Dr. Richard S. Storrs, of Braintree, Mass.; and the Rev. Dr. Leonard Woods, pres. of Bowdoin College. He edited several works, to some of which he furnished introductions; wrote a *Memoir of the Life and Character of Samuel Hopkins, D.D.* (1852), which appeared with a collection of Hopkins's works and soon passed to a second edition; a memoir of 370 pages to accompany *The Writings of Prof. B. B. Edwards* (1853); and a *Memoir of Nathanael Emmons* (1861), which appeared in Vol. I. of Dr. Emmons's theological works and was afterward issued by itself. With Austin Phelps and Lowell Mason he compiled *The Sabbath Hymn-Book* (1858), which had an immense sale; and with Dr. Austin Phelps and Dr. Daniel L. Furber published *Hymns and Choirs* (1860). For the latter work he wrote an elaborate essay on *The Text of Hymns.* He also published a pamphlet on *The Associate Creed of Andover Theological Seminary* (1883), and a volume entitled *Discourses on Some Theological Doctrines as Related to the Religious Character* (1885). He spent considerable time in Europe 1842-3; 1862-3; and in Europe, Egypt, and Palestine 1869-70. He strongly antagonized the 'new department of recent years' at the Andover Theological Seminary, and strenuously opposed any deviation from the historic standards of the doctrines taught at that institution. Dr. Park was for many years noted for marvelous acuteness of thought, for a literary style faultlessly pure and of rare vigor and grace, and for a finished and impressive delivery in the pulpit. His lectures drew admiring and enthusiastic classes to Andover, and were recognized as communicating to his students an unusual mental stimulus.

PARK, Munco: famous African traveler: 1771, Sep. 10—1805 or 6; b. at Fowlsheils, near Selkirk, Scotland; son of a farmer. He studied medicine in Edinburgh, and afterward went to London, where he obtained the situation of assistant-surgeon in a vessel bound for the East Indies. When he returned 1793, the *African Association* of London had received intelligence of the death of Major Houghton, who had undertaken a journey to Africa at their expense. Park offered himself for a similar undertaking, was accepted, and sailed from England 1795, May 22. He spent some months at the English factory of Pisania on the Gambia, making preparations for his further travels, and learning the Mandingo language. Leaving Pisania Dec. 2, he traveled eastward; but when he had nearly reached the place where Houghton lost his life, he fell into the hands of a Moorish king, who imprisoned him, and treated him so roughly, that Park seized an opportunity of escaping (1796, July 1). In the third week of his flight, he reached the Niger, the great object of his search, at Sego, in the kingdom of Bambarra, and followed its course downward as far as Silla; but meeting with hindrances that compelled him to retrace his steps, he pursued his way west along its banks to Bammakoe, and then crossed a mountainous country till he came to Kamalia, in the kingdom of Mandingo, Sept. 14, where he was taken ill, and lay for seven months. A slave-trader at last conveyed him again to the English factory on the Gambia, where he arrived 1797, June 10, after an absence of 19 months. He published after his return to Britain, *Travels in the Interior of Africa*, (London, 1799), a work which at once acquired high popularity. He then married and settled as a surgeon at Peebles, where, however, he did not acquire an extensive practice; and 1805, he undertook another journey to Africa, at the expense of the government. When he started from Pisania, he had a company of 45, of whom 36 were European soldiers; but when he reached the Niger in August, his attendants were reduced to seven, so fatal was the rainy season in those regions to Europeans. From Sansanding on the Niger, in the kingdom of Bambarra, he sent back his journals and letters 1805, November, to Gambia; and built a boat, in which he embarked, not, as he should have done, with native assistants habituated to the country, but with four European companions, and reached the kingdom of Houssa; where he and they are believed to have been murdered by the natives, or drowned as they attempted to sail through a narrow channel of the river. The fragments of information and other evidence picked up among the natives by Clapperton and Lander (q.v.), strongly confirm the last view of the fate of Park and his companions. An account of Park's second journey was published at London 1815. Park's narratives are of considerable value, particularly for the light which they throw upon the social and do-

mestic life of the negroes, and on the botany and meteorology of the regions through which he passed; but he was unfortunately cut off before he had determined the grand object of his explorations—the discovery of the course of the Niger. It is evident that he lacked the sagacity and foresight requisite for a great explorer, though he showed high courage and indomitable perseverance.

PARK, Roswell, A.M., M.D., LL.D.: American physician: b. Pomfret, Conn., 1852, May 4. He was educated at Racine College and Harvard, studied medicine at the Northwestern University, and was adjunct professor of anatomy there 1879–82. Since 1883 he has been professor of surgery at the University of Buffalo and surgeon to the Buffalo General Hospital. He was one of the attendants upon President McKinley after the latter was shot. He has published: *Lectures on Surgical Pathology* (1891); *History of Medicine* (1897); *Text-Book of Surgery* (2 Vols., 1896); *The Principles and Practice of Modern Surgery* (1907); etc.

PARKA, *pârka:* name given by Fleming to a fossil from the Old Red Sandstone, about which there has been much difference of opinion. The quarrymen called them 'berries,' from their resemblance to a compressed raspberry. They were compared by Fleming to the panicles of a Juncus, or the globose head of a Sparganium. Lyell thinks that they resemble the egg-cases of a Natica, while Mantell suggested that they were eggs of a batrachian. The general opinion now is that they are eggs of the Pterygotus.

PARKE, *pârk*, John: 1754, Apr. 7—1789, Dec. 11; poet; b. Dover, Del. He was educated at the Univ. of Pennsylvania, served through the Revolutionary war, entering the quartermaster's dept., and by various promotions reaching the rank of lieut.-col. After the war he resided several years in Philadelphia, then removed to Va. He published a peculiar book entitled *The Lyric Works of Horace, translated into English Verse, to which are added a number of Original Poems by a Native of America* (1786). He died near Dover.

PARKE, John Grubb: b. near Coatsville, Penn., 1827, Sept. 22; d. Washington, D. C., 1900, Dec. 16. He graduated from the West Point Milit. Acad. 1849, was connected with the topographical engineers, made surveys in the central and western states, and was chief of the force engaged 1857–61 in locating the United States northwestern boundary. He was made brigadier general of volunteers 1861, Nov. 23, was with Gen. Burnside in North Carolina, was in the battles of South Mountain, Antietam, and Fredericksburg, served in Mississippi and Tennessee, and aided in the capture of Lee's army. He was engaged in surveying and engineering operations 1866–87, in the latter year became superintendent of West Point Military Academy;

and at his request was retired 1889, June, under the 40-years' service law. He was breveted lieutenant-colonel, brigadier general, and major general U. S. army; and promoted major general of volunteers 1862; lieutenant colonel of engineers 1879, and colonel 1884. He published: *Compilations of Laws Relating to Public Works for the Improvement of Rivers and Harbors* (1877); *Laws Relating to the Construction of Bridges over Navigable Waters* (1882); etc.

PARKER, *pâr'kėr:* family distinguished in the annals of the British navy.—The founder of the family was Sir HUGH PARKER, alderman of London, who received a baronetcy 1681.—His grand-nephew, Sir HYDE PARKER, commanded the British fleet in the action off the Dogger Bank, 1781, Aug. 5, in which three Dutch ships were destroyed, and the rest of the Dutch fleet compelled to retreat into harbor. In 1783 he was appointed to command the British fleet in the E. Indies; but the ship in which he sailed thither was lost, with all on board.—His second son, Sir HYDE PARKER, distinguished himself in the American war; blockaded the Dutch harbors with a small squadron 1782; commanded the British fleet in the W. Indies 1795; and 1801 was appointed to chief command of the fleet sent to the Baltic to act against the armed coalition of the three states of Russia, Sweden and Denmark. He had no share in the battle of Copenhagen, in which Nelson engaged contrary to his orders; but by his appearance before Carlserona, he compelled the neutrality of Sweden; and he was on the point of sailing for Cronstadt, when the news of Czar Paul's death put an end to hostilities.—His kinsman, Sir WILLIAM PARKER, was also a British admiral of high repute for skill and bravery, and contributed to some of the great victories of the close of last century.—Sir PETER PARKER, 1716-1811, admiral of the fleet, served with distinction during the Seven Years' and the American wars; and 1782 brought the French admiral, De Grasse, prisoner to England, for which he received a baronetcy.—Sir WILLIAM PARKER, 1781-1866, commanded the frigate *Amazon* 1806, and took, after a hard battle, the French frigate *La Belle Poule* belonging to the squadron of Admiral Linois; and 1809 captured the citadel of Ferrol. In 1841 he succeeded Admiral Elliot in command of the fleet in the Chinese seas during the first Chinese war; took possession of Chusan, Ningpo, and Shapu; forced the entrance of the Yang-tze-kiang; and arrived under the walls of Nanking, where the treaty of peace was agreed upon. For these services, he received a baronetcy 1844. In autumn 1849 he sailed to the Dardanelles, at the request of Sir Stratford Canning (afterward Lord Stratford de Redcliffe), to support the Porte against the threatening demands of Austria and Russia concerning political fugitives. In 1851 he was made Admiral of the Blue, 1853 Admiral of the White, 1858 Admiral of the Red, and 1862 Rear Admiral of the United Kingdom.

PARKER, Alton Brooks: American jurist: b. Cortland, N. Y., 1852, May 14. He was educated at the Cortland normal school, then taught school for a time and studied law. After graduating from the Albany law school he was admitted to the bar and began practice at Kingston, N. Y. In 1877 he was elected surrogate of Ulster Co., being the only one official elected out of the entire Democratic ticket. His re-election took place in 1883. A year later he served as delegate at the Democratic National Convention and, in 1885, was offered, by President Cleveland, the position of First Assistant Postmaster General. He declined. Shortly afterward, he was chosen chairman of the Democratic State Committee. Later in 1885, to fill a vacancy, he was appointed judge of the State Supreme Court and was subsequently confirmed by election. In 1889 his appointment to the second division of the Court of Appeals took place. On the dissolution of that court, his services were transferred to the general term of the first division. In 1896 he became a member of the Appellate Division and during the following year was chosen by his associates as chief justice of the Court of Appeals. As an active Democrat he has always been prominent in his party, receiving the presidential nomination in 1904, his opponent, Theodore Roosevelt, being victorious. Judge Parker is now a practicing member of a prominent New York firm of lawyers.

PAR'KER, Cortland, ll.d.: b. Perth Amboy, N. J., 1818, June 27; d. 1907. He graduated from Rutgers College 1836, commenced the study of law under Theodore Frelinghuysen, and when the latter was made chancellor he entered the University of New York, from which he graduated 1839. He practiced law in Newark, N. J., and soon rose to eminence. He aided in revising the N. J. state laws 1875, and was a member of the commission which located the disputed boundaries of N. J. and Delaware.

PAR'KER, Edward Harper, m.a.: English Chinese scholar: b. 1849, July 3. He was educated at the Royal Institution School, Liverpool, and became a barrister of the Middle Temple. He originally intended to engage in the tea trade, studied Chinese, and as an interpreter traveled in Mongolia 1869-71. He was then in the consular service in various parts of the world (1871-95), and since 1901 has been professor of Chinese in Victoria university, Manchester. He is the author of *Comparative Chinese Family Law* (1879); *Up the Yangtze* (1892); *Burma* (1893); *A Thousand Years of the Tartars* (1895); *China* (1901); *John Chinaman* (1901); *China, Past and Present* (1903); *China and Religion* (1905); etc.

PAR'KER, Ely Samuel: b. in the Indian reservation, Tonawanda, N. Y., about 1828; d. 1895, Aug. 31.

He belonged to the Seneca tribe, and was chief of the Six Nations. He became a civil engineer; in the war against secession was a member of the staff of Gen. Grant, and toward the close of the war became one of his secretaries. He was appointed captain, 1863; received numerous brevets, including brigadier-general of volunteers, and brigadier-general U. S. A.; was appointed first lieutenant of cavalry 1866, and resigned 1869, Apr. 26. He was commissioner of Indian affairs, 1869-71.

PAR'KER, Foxhall Alexander, naval officer: 1821, Aug. 5.—1879, June 10; b. New York. He graduated from the Philadelphia naval school 1843, was an officer in the navy-yard, Washington 1861-2, assisted in preparing the Army of the Potomac, drilled a large number of seamen in the use of arms and artillery, commanded the *Mahaska,* and afterward the *Wabash,* and from 1863, Sept., till the close of the war was in command of the Potomac flotilla, and was in numerous engagements. He was chief signal officer of the navy 1873-76 and superintendent of the Annapolis Naval Academy 1878 till his death. He became lieutenant, 1850, commander 1862, captain 1866, commodore 1872. He was a founder of the Naval Institute, a contributor to the press, and published *The Fleets of the World* (1876); *The Battle of Mobile Bay* (1878); and several works used as text-books in the naval academy.

PAR'KER, Sir Horatio Gilbert, d.c.l., f.r.s.c.: Canadian novelist: b. Camden East, Ont., 1862, Nov. 23. He was educated at the normal school, Ottawa and Trinity College, Toronto. Took up journalistic work about 1882 and was associated with the Sydney (Australia) *Morning Herald* for a time and began writing plays. Removed to England 1890, was knighted in 1902 and elected to parliament for Gravesend in 1900 and 1906. His works include: Poems, *A Lover's Diary* (1894); Plays, *Adaptation of Faust* (1888); *The Vendetta* (1889); *No Defence* (1889); *Seats of the Mighty* (1897); *The Wedding Day.* Travels *Round the Compass in Australia* (1892). Novels and Stories, *Pierre and His People* (1892); *Mrs. Falchion* (1893); *The Trespasser* (1893); *Translation of a Savage* (1894); *The Trail of the Sword* (1894); *When Valmond Came to Pontiac* (1895); *An Adventurer of the North* (1895); *The Seats of the Mighty* (1896); *The Pomp of the Lavillettes* (1897); *The Battle of the Strong* (1898); *The Lane that Had No Turning* (1900); *The Right of Way* (1901); *Donovan Pasha* (1902); *History of Old Quebec* (1903); *A Ladder of Swords* (1904).

PARKER, Horatio William, a.m., Mus. Doc.: American musician and composer: b. Auburndale, Mass., 1863, Sept. 15. His education was for the most part European, and in 1885 he graduated from the Munich Royal Conservatory. After that time he was professor of music in the Cathedral School of St. Paul, Garden

City, L. I., and organist of Holy Trinity Church, New York, until 1893, when he became organist of Trinity Church, Boston. Since 1894 he has been professor of the theory of music at Yale University. His compositions rank high in American music; they include the oratorio *Hora Novissima*, the first American music given at an English musical festival; *A Wanderer's Psalm*, also given at one of the English festivals; the oratorio of *St. Christopher;* the cantatas *King Trojan* and *The Kobolds;* etc. In 1902 he received the degree of Mus. Doc. from Cambridge University.

PARKER, Sir Hyde: English admiral: b. Devonshire, England, 1739; d. 1807, Mar. 16. He entered the British navy, served in the war of the American Revolution, where in 1776 he commanded a small squadron, and for services in the North River was knighted in 1779. He was promoted rear admiral in 1793, vice admiral in 1794, and appointed commander-in-chief at Jamaica in 1796. He returned to England in 1800, was given command of the Baltic fleet and moved northward to check the measures of the armed neutrality formed by Russia, Sweden, and Denmark. In the battle of Copenhagen he had no share, it being an independent move of Nelson's. Parker compelled Sweden to remain inactive by his appearance before Carlskrona, and was preparing to move upon Cronstadt when the death of Emperor William ended hostilities. He was shortly afterward succeeded by Nelson.

PARKER, Joel: American legislator: b. Monmouth County, N. J., 1816, Nov. 24; d. Philadelphia, Pa., 1888, Jan. 2. He was graduated from Princeton in 1839, admitted to the bar in 1842, and established a law practice in Freehold, N. J. He engaged in politics with much zest, and in 1847 was elected to the legislature; in 1852-7 he was prosecuting attorney of Monmouth County, and in 1861, at the outbreak of the Civil war, was appointed major-general of volunteers. In 1862-6 he was governor of New Jersey, giving loyal support to the policy of the national administration. He was again elected governor in 1870, and in 1880 was appointed associate justice of the supreme court of New Jersey, and reappointed in 1887.

PAR'KER, Joel, ll.d.: jurist: 1795, Jan. 25—1875, Aug. 17; b. Jaffrey, N. H. He graduated from Dartmouth College 1811, studied law, was appointed associate justice of the state supreme court 1833, chief-justice 1836, and was law professor in Harvard from 1847 till his death. He was in the state legislature 1824-26 and chairman of the committee which revised the state laws 1840. He published numerous reports, essays, and addresses, and several books, including *Revolution and Reconstruction* (1866), and *Conflict of Decisions* (1875). He died at Cambridge, Mass.

PAR'KER, John Henry, c.b.: architectural archeolo-

gist: 1806-1884, Jan. 31; b. London. After obtaining an education he became a bookseller 1821, succeeded his uncle, Joseph P., in the same business at Oxford 1832, and was very successful. He gave much time to architectural studies, favored the restoration of ancient ecclesiastical buildings, and made extensive excavations in Rome to determine the historical basis of numerous tales which had been regarded as legendary. In recognition of his archeological discoveries, the king of Italy conferred on him a decoration, and Pope Pius IX. presented him a medal. He wrote several valuable works.

PARKER, Joseph: English Congregational clergyman: b. Hexham-on-Tyne, Northumberland, 1830, April 9; d. London, 1902, Nov. 28. He studied at University College, London, in 1853 became pastor of the Congregational Church at Banbury, and in 1858-69 was pastor of the Cavendish Street Church at Manchester. In 1869 he began his larger ministry at the old Poultry Chapel of London, the congregation of which was transferred in 1874 to the City Temple, Holburn Viaduct. At the City Temple he conducted three services weekly, two on Sunday, and one at noon on Thursday. He became one of the best-known preachers in England. His views were liberal, and he spoke with a ready command of vigorous English. In 1887 he visited the United States. He was twice chairman of the Congregational Union of England and Wales, and published several works including: *Ecce Deus* (1868); *The Paraclete* (1874); *The People's Bible*, discourses upon Holy Scripture, forming a pastoral commentary (25 vols. 1885 *et seq.*); *Christian Profiles in a Pagan Mirror* (1898); and *A Preacher's Life*, an autobiography (1899). Consult the *Life* by Adamson (1903).

PARKER, Leonard Fletcher, d.d.: American historian: b. Arcade, N. Y., 1825, Aug. 3. After graduating from Oberlin College in 1851 he became superintendent of schools at Brownsville, Pa., 1853–56 and at Grinnell, Ia., 1856–60; was professor of Greek at Iowa College 1860–70, professor of history in the State University of Iowa 1870–87, Parker professor of history at Iowa College 1888–98, and since 1898 professor emeritus. He was a member of the Iowa legislature 1868–70 and has written: *History of Education in Iowa;* etc.

PARKER, Louis Napoleon: English dramatist and composer: b. Calrados, France, 1852, Oct. 21. He was educated at Freiburg and the Royal Academy of Music, and was director of music in Sherborne School, Dorsetshire, 1877-96. In the latter year he removed to London and in 1898 was made a fellow of the Royal Academy of Music. He is the author of many cantatas, such as *Silvia* and the *Twenty-third Psalm*, as well as many other musical compositions, and of a large number of plays. Among the latter may be cited *Change Alley*, and *The Man in the Street*. He has also translated *Magda; L'Aiglon; Cyrano de Bergerae;* etc.

PAR'KER, MATTHEW, D.D.: second Prot. archbishop of Canterbury: 1504, Aug. 6—1575, May 17; b. Norwich. He studied at Corpus Christi College, Cambridge, and was ordained priest 1527. At the univ., he was a distinguished student, especially of the Scriptures and of the history of the church, even to antiquarian minuteness; yet, in spite of his strong leaning to the past, he was from an early period favorably disposed toward the doctrines of the Reformation, and lived in close intimacy with some of the more ardent reformers. In 1533 he was appointed chaplain to Queen Anne Boleyn, who thought very highly of him, and not long before her death, exhorted her daughter Elizabeth to avail herself of P.'s wise and pious counsel. In 1535 he obtained the deanery of the monastic college of Stoke-Clare in Suffolk—*Roman Catholicism* being still the professed religion of the land, for Henry had not yet formally broken with the pope—and here P. continued his pursuit of classical and ecclesiastical literature, and set himself to correct the prevailing decay of morals and learning in the church, by founding a school for instruction in grammar and humanity. Here he appears to have definitely sided with the reforming party in the church and state—the sermons which he preached containing bold attacks on Rom. Cath. tenets and practices. In 1538 P. took the degree D.D.; and 1544, after some minor changes, became master of Corpus Christi College, Cambridge, which he ruled admirably. Three years later, he married Margaret Harlstone, daughter of a Norfolkshire gentleman. It was probably about this time that he drew up his defense of the marriage of priests, *De Conjugio Sacerdotum*. In 1552 he was presented by King Edward VI. to the canonry and prebend of Covingham, in the church of Lincoln. On the accession of Queen Mary, he refused to conform to the re-established order, and was deprived of his preferments, and even compelled to conceal himself. It does not appear, however, that he was eagerly sought after by the emissaries of Mary; for he was no fanatic or iconoclast, but, on the contrary, though sincerely attached to the common Protestant doctrines, unwilling to disturb the framework of the church. P. spent at least some portion of his compulsory seclusion from public life in the enlargement of his *De Conjugio Sacerdotum*, and in translating the Psalms into English metre. The death of Mary, and the accession of Elizabeth, called him from his learned retirement; and he was appointed by the queen, abp. of Canterbury. The consecration took place in Lambeth chapel, 1559, Dec. 17. For the vain charge against the validity of this act, see NAG'S HEAD CONSECRATION.

'The subsequent history of Archbishop Parker,' it has been justly remarked, 'is that of the Church of England.' The difficulties that beset him were very great. Elizabeth herself was much addicted to various 'popish' practices. such as the reverence of images, and was

strongly, even violently, in favor of the celibacy of the clergy: she went so far as to insult P.'s wife on one occasion. But his greatest anxiety was in regard to the spirit of sectarian dissension within the church itself. Already the germs of *Puritanism* were beginning to spring up, and there can be no doubt that their growth was fostered by the despotic caprices of the queen. P. himself was manifestly convinced that if ever Protestantism was to be firmly established in the land at all, some definite ecclesiastical forms and methods must be sanctioned, to secure the triumph of order over anarchy; so he vigorously set about the repression of what he thought a mutinous individualism incompatible with a catholic spirit. That in this he always acted wisely or unblamably, cannot be affirmed; his official situation was most difficult and trying for one who, like P., combined conscientious sincerity with a natural charitableness of spirit. In his office he was gradually drawn into intolerant and inquisitorial courses; and as he grew older, he grew harsher. To forbid 'prophesyings,' or meetings for religious discourse, was something very like persecution. Fuller (who must have his pun, however bad) says of him: 'He was a Parker indeed, careful to keep the fences.' His struggle against Puritanism involved a lasting injury to his reputation, as also to his health. Yet it must not be forgotten that to P. we owe the *Bishops' Bible*, undertaken at his request, carried on under his inspection, and published at his expense 1568. He had also a principal share in drawing up the *Book of Common Prayer*, for which his skill in ancient liturgies peculiarly fitted him, and which in many parts bears the impress of his generally broad, moderate, and unsectarian intellect. It was under his presidency, too, that the *Thirty-nine Articles* were finally revised and subscribed by the clergy (1562).

Among other literary performances, P. published an old *Saxon Homily on the Sacrament*, by Ælfric of St. Albans, to prove that Transubstantiation was not the doctrine of the ancient English church; edited the histories of Matthew of Westminster and Matthew of Paris (see PARIS, MATTHEW OF); and superintended the publication of a most valuable work, *De Antiquitate Britannicæ Ecclesiæ*, printed probably at Lambeth 1572, where the abp., we are told, had an establishment of printers, engravers, and illuminators. He also founded the 'Society of Antiquaries,' and was its first pres.; and endowed the Univ. of Cambridge, particularly his own college, with many fellowships and scholarships, and with a magnificent collection of MSS. relating to the civil and ecclesiastical condition of England, and belonging to nine different centuries (8th–16th). Of this collection, Fuller said that it was 'the sun of English antiquity before it was eclipsed by that of Sir Robert Cotton.'

PAR'KER, Peter, M.D.: 1804, June 18—1888, Jan. 10; b. Framingham, Mass. He graduated from Yale 1831, studied theol., and graduated also from the medical department of the college. He was ordained 1834, and immediately sailed to China as a missionary under the auspices of the American Board. His first work was the establishment of a hospital at Canton. He was remarkably successful in treatment of diseases and injuries, and during the first year about 2,000 cases were treated. In addition to his medical and surgical work, P. held religious services and often preached at the hospital. He also gave medical and surgical instruction to Chinese students. In 1837 he visited Japan, and while the war between England and China was in progress, 1840–42, he lived in the United States. In 1842 he returned to his hospital work in China. About 3 years later he resigned his position with the American Board, became connected as interpreter and secretary with the U. S. embassy, and during the absence of the U. S. minister was *chargé d'affairs*. Failing health brought him to the United States 1855, but he soon returned as govt. commissioner to revise the treaty with China. In 1857 he settled at Washington, D. C. He was a regent of the Smithsonian Institution, one of the corporate members of the American Board, and was pres. of a branch of the Evangelical Alliance 1887. He published several books, including *Eulogy on Henry Wilson* (1880). He died at Washington.

PAR'KER, Theodore: rationalistic preacher, reformer and scholar: 1810, Aug. 24—1860, May 10; b. Lexington, Mass. His grandfather was cap. of a militia company at the battle of Lexington; his father a farmer and mechanic of the New England type, strong in will and independent in thought; his mother a woman of delicate mind and of high moral ideals. His boyhood was spent at the district school, on the farm, and in the workshop. At the age of 17, he taught a school, and earned money to enter Harvard College 1830. During his collegiate course, he supported himself by teaching private classes and schools; and studied metaphysics, theology, Anglo-Saxon, Syriac, Arabic, Danish, Swedish, German, French, Spanish, and modern Greek. Entering the divinity class, at the end of his collegiate course, he began to preach 1836; was an editor of the *Scriptural Interpreter*, and settled as Unitarian minister at West Roxbury, Mass., 1837. The naturalistic or rationalistic views which separated him from the more conservative portion of the Unitarians attracted wide notice first in consequence of his ordination sermon in Boston 1841, on *The Transient and Permanent in Christianity*. In this sermon he denied the special authority of the Bible, of Christianity, and even of the Christ; and asserted that nothing in Christianity had any permanence except 'the absolute religion,' which he defined as pure morality, unhindered love to God, and love to man. The contest which arose on the anti-supernaturalism of this dis-

course led him to develop his theological views in five lectures, delivered in Boston, pub. (1841) under the title *A Discourse of Matters Pertaining to Religion;* followed by *Sermons for the Times.* These radical and at times defiant public utterances led to a break between P. and the current Unitarianism of that day, which was not ready to discard the lordship of the personal Christ. Failing health induced P. to make an extended tour in Europe. In 1845 he returned to Boston, preached to large audiences at the Melodeon, and wrote for the *Dial*, *Christian Register*, *Christian Examiner*, and *Massachusetts Quarterly.* He became also a popular lecturer, and was active and earnest in opposition to slavery, the Mexican war, and the Fugitive Slave Law, for resisting which, by more than words, he was indicted. In the midst of his work, he was attacked, 1859, with bleeding from the lungs, and made a voyage to Mexico, where he wrote *Experience as a Minister;* thence he sailed to Italy, where he died at Florence. His works, chiefly miscellanies, lectures, and sermons, have been collected and published in America and England, in which his peculiar views in theology and politics are sustained with great keenness of argument and felicity of illustration. His library, 13,000 vols., he bequeathed to the Boston Public Library.—P.'s scholarship as a linguist was of extraordinary range; he had also a various learning. His intellectual movement was pervaded with moral sincerity, which gave it directness, vividness, and all the force that belongs to deep conviction. Thence, in the department of practical philanthropy, his fearless activity was exceedingly powerful and beneficent. In the realm of religious philosophy and criticism, his thought shows lack of accurate discrimination, and a frequently puzzling variation in definition—e.g., in his sometimes pantheistic, sometimes theistic, attitude. By this defect, his influence on religious thought was rendered far less abiding than his abilities would seem to warrant. His lack of taste and of delicate feeling is often perceptible in his works. Yet he is to be honored for his unquestionable sincerity, and for the courage of his assault on legalized wrong. See P.'s *Life and Correspondence*, by Weiss (1864).

PAR'KER, WILLARD, LL.D.: surgeon: 1800, Sep. 2—1884, Apr. 25; b. Hillsborough co., N. H. He taught school before and after graduation from Harvard 1826; studied medicine under Dr. John C. Warren, and graduated from the medical dept. at Harvard 1830. He was prof. of anatomy at the Berkshire Medical College 1830–33, and of surgery 1833–36, when he accepted a professorship in a medical college in Cincinnati. He visited Europe 1837, and was prof. of surgery in the New York College of Physicians and Surgeons 1839–69 and prof. of clinical surgery in the same institution 1869 till his resignation shortly before his death. He was remarkably skilful and successful in surgical operations, held the first college clinic in this country, and was a popular

teacher. He was one of the leaders in organizing the Bellevue Hospital, and the Board of Health, in New York; was pres. of the N. Y. Inebriate Asylum at Binghamton for several years, and consulting surgeon to some of the principal hospitals in New York. He made several important discoveries, and valuable improvements on the methods of performing various surgical operations. Largely through his efforts a soc. to relieve needy widows and orphans of medical men was established 1846, and the New York Acad. of Medicine 1847. Of the latter soc. he was pres. for several years from 1856.

PARKERSBURG, *pâr'kėrz-bėrg:* city, cap. of Wood co., W. Va., on the Baltimore and Ohio, the Baltimore and Ohio Southwestern, and the Ohio River railroads, and at the juncture of the Little Kanawha with the Ohio river; 96 m. from Wheeling. The railroad bridge crossing the Ohio river is one of the longest in the world (1⅓ miles). The industies of P. include large lumber mills, oil refineries, iron and steel works, machine shops, oil well supply works, furniture and brick and tile factories, flour mills, breweries, and veneer works. There are valuable clay and coal deposits at P., also gas and petroleum wells, and noted mineral springs. An extensive trade is carried on in manufactured goods, farm products, coal and petroleum. P. contains a court-house, government building, the Academy of the Visitation and the Washington High School. There are several other public school buildings, numerous churches, banks and newspapers. Many steamers ply on the rivers, and there is quite an exportation of timber to England. Pop. (1900) 11,703; (1910) 17,842.

PARKES, *pârks,* Sir HARRY SMITH, G.C.M.G., K.C.B.: 1828–1885, Mar. 22; b. Birchill's Hall, Staffordshire, England; son of Harry P. He was educated in London, entered the govt. civil service in China 1852, and 1854 was appointed consul at Amoy. He was sec. to Sir John Bowring in his mission to Siam, carried the treaty papers to England 1855, and after their ratification returned to the East. He was consul at Canton 1856–58, was British commissioner at that port while it was occupied by the allies 1858–61, and was knighted for valuable services. He was imprisoned by the Chinese, and treated with great cruelty; became consul at Shanghai 1862; and was promoted to a higher degree of knighthood. In 1865 he was appointed minister and consul-gen. to Japan, which position he held 18 years. During this period he greatly aided Christian missionary operations in that country, and negotiated important commercial treatics between Japan and several European powers. He was appointed Brit. minister to Peking 1883, and held this office till his death.

PARKES, Sir Henry: Australian statesman: b. Stoneleigh, Warwickshire, 1815, May 27; d. 1896, April 27. His father was a farmer; the son became an ivory turner and in 1839 emigrated to Sydney. For several years his life was a hard struggle with poverty. He entered politics as a leader of the 'anti-transportationists'; founded in 1849 *The Empire*, a liberal organ which he edited until 1857; in 1854 was elected to the Legislative Council, in which he led the fight for responsible government; was a member of Parliament for East Sydney 1858-61, colonial secretary 1866-8, and again a member of the colonial parliament 1871, becoming prime minister of New South Wales in 1872. His cabinet remained in office until 1875, and he was again prime minister 1878-82 and 1887-9. He was a prominent adherent of the cause of Australian federation, insisted on democracy as the basis of any such scheme, and successfully opposed Wentworth's plan of a bicameral Legislature, with colonial peers in the upper House. He was a personal friend of Tennyson, and himself wrote several volumes of verse. Consult his political autobiography, *Fifty Years in the Making of Australian History* (1892); the *Life* by Lynes (1897); and an article by Marin La Meslée in *Revue des Deux Mondes* (1892, Tome III.)

PARKESINE, *pârks'ĭn* or *-ēn:* artificial substitute for such natural substances as horn, ivory, bone, tortoise-shell, etc.

PARKHURST, *pârk'hėrst*, Charles Henry, dd., ll.d.: b. Framingham, Mass., 1842, Apr. 17. He studied at Lancaster Academy, Mass., graduated from Amherst College 1866, was principal of the Amherst High School 1867-69, studied theology under Pres. J. H. Seelye, and later under Tholuck at Halle 1869-70, was professor of Greek at Williston Seminary, Mass., 1870–72, and studied philosophy and theology at Leipzig 1872-3. He was pastor of the Congl. Church, Lenox, Mass., 1874-80, and 1880, Mar. 9, became pastor of the Madison Square Presbyterian Church, New York. In 1891 he succeeded the late Howard Crosby as president of the Society for Prevention of Crime, but resigned in 1908. He has published *The Latin Verb Illustrated by the Sanscrit* (1870); *The Blind Man's Creed, and Other Sermons* (1883); *Pattern in the Mount, and Other Sermons* (1885); and various smaller religious works; *Our Fight with Tammany* (1894); *The Sunny Side of Christianity, Talks to Young Men and to Young Women* (1897); *Guarding the Cross with Krupp Guns* (1900).

PARKHURST, Howard Elmore: American musician and author: b. Ashland, Mass., 1848, Sept. 13. Beside various musical compositions he is the author of *The Birds' Calendar* (1894); *Songbirds and Waterfowl* (1897); *How to Name the Birds* (1898); *Trees, Shrubs and Vines of Northwestern United States* (1903).

PARKHURST, John: English biblical scholar: 1728, June—1797, Mar. 21. He was educated at Rugby and at Cambridge. In 1762 appeared his Hebrew and English lexicon—creditable for its time, and widely used, but long since entirely superseded by the works of critical scholars.

PARKIN, George Robert: Canadian author: b. Salisbury, N. B., 1846. He graduated from the University of New Brunswick 1868 and at once became head master of Bathurst grammar school; took a special course at Oxford University and after returning to Canada, was for fifteen years principal of the collegiate school, Fredericton. In 1889 he commenced the active advocacy of Imperial unity and spoke throughout Canada, Australia and Great Britain under the auspices of the Imperial Federation League; was appointed principal of Upper Canada College 1895 and in 1902 became organizing manager of the Cecil Rhodes Scholarships. Among his works are: *Re-Organization of the British Empire* (1882); *Round the Empire* (1892); *Imperial Federation: The Problem of National Unity* (1892); *Geographical Unity of the Empire* (1894); *The Great Dominion; Studies of Canada* (1895); *Life of Dr. Edward Thring* (1897).

PARKINSONIA, *pär-kĭn-sō'nĭa:* genus of plants of nat. order *Leguminosæ,* sub-order *Cæsalpinieæ.—P. aculeata* is a W. Indian shrub or small tree, which, in flower, is one of the most splendid objects in the vegetable kingdom. It has pinnated leaves, with winged leaf-stalk, and large yellow flowers spotted with red. It is furnished with strong spines, and is often used for hedges; whence it is called the Barbadoes Flower Fence. It is now common in India.

PARKMAN *pârk'man,* Francis, Jr., ll.d.: 1823, Sep. 16—1893, Nov. 8: historian; son of Francis P., d.d., and on his mother's side descended from the Rev. John Cotton. He graduated from Harvard College 1844, spent some time in European travel, and 1846 explored the Rocky mountain region, where he formed the acquaintance of various Indian tribes and suffered hardships which permanently injured his health and caused partial blindness. He describes his western tour in a series of sketches for the *Knickerbocker Magazine,* which later appeared in book form with the title *The Oregon Trail* (1847) and passed through eight editions. This was followed by *The Conspiracy of Pontiac* (1851) of which ten editions were issued, and a novel, *Vassall Morton* (1856). In order to obtain facts for a series of historical works, he made several trips to France and traveled extensively in the United States and Canada. These works, which form a series under the general name of *France and England in North America,* were entitled *Pioneers of France in the New World* (1865): *The Jesuits in North America in the 17th Century* (1867);

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La Salle and the Discovery of the Great West (1869); *The Old Régime in Canada* (1874); *Count Frontenac and New France under Louis XIV.* (1877); *Montcalm and Wolfe* (2 vols. 1884); *A Half Century of Conflict* (1892). Dr. Parkman was a member of the London Society of Antiquarians, and a corresponding member of the Royal Society of Canada. Parkman's constitution had been undermined by the hardships of his life among the Indians and his work was greatly handicapped. From 1853 to 1863 his health prevented him from doing any historical work, and at this time he gave his attention to horticulture, in which he was particularly successful; he wrote several valuable horticultural papers and *The Book of Roses*, still a recognized authority. In 1868 he was overseer of Harvard, resigned this position in 1869 and became professor of horticulture; and in 1875–88 was a fellow of Harvard. The courage and persistency with which he overcame the obstacles of ill health and ruined eyesight were truly heroic. Often he could work only a few minutes at a time; he had all documents and manuscripts read to him, taking as few notes as possible, and dictated from his notes; yet he brought to full completion the great work he had planned. Parkman chose for his subject a theme entirely untouched by other writers, and dealt with it so successfully as to obtain preëminent rank among historians. His histories are not philosophical, yet are written with a breadth of view and a sense of proportion that mark the philosophic spirit. Nowhere does he show his power more clearly than in his sympathetic and vivid portrayal of many widely different characters. He combined to an unusual degree the merits of both the scientific and literary historian. None of the most scientific of modern historical students has surpassed him in thorough and exhaustive research, while his literary style is marked by a clearness, beauty and dramatic power that give to his histories the fascination of the best of romance. Consult Farnham, *Life of Parkman* (1901).

PARLANCE, n. *pâr'lăns* [Norm. F. *parlance*, speech: F. *Parlant*, speaking—from *parler*, to speak]: conversation; idiom of common talk. In common parlance, in the usual form of speech.

PARLEY, n. *pâr'lĭ* [F. *parler*, to speak—from mid. L. *parab'olārĕ*, to relate, to speak]: conference on some point of mutual concern: in *milit.*, an oral conference with an enemy under a flag of truce, usually at some spot—neutral for the time—between the lines of the two armies: v. to confer with an enemy; to treat or discuss orally. Parleying, imp. *pâr'lĭ-ĭng*. Parleyed, pp. *pâr'lĭd*. To beat a parley, to beat a drum or sound a trumpet in a particular way, as a signal that a conference with the enemy is desired. Parle, v. *pâr'l*, in OE. to discuss a thing orally; to talk: n. conversation; talk; an oral treaty.

PARLIAMENT, n. *pâr'lĭ-mĕnt* [F. *parlement;* Sp. and It. *parlamento*, a conversation, parliament—from It. *parlare;* F. *parler*, to speak: mid. L. *parliamentum*]: in the united kingdom of Great Britain and Ireland, the general and supreme council of the nation (see below): in France, certain high courts of justice in existence before the Revolution. PAR'LIAMENTA'RIAN, n. a. *-tā'rĭ-ăn*, term used during the civil war, denoting adherence to parliament, in opposition to the royalists, who adhered to Charles I.: in modern usage, one versed in parliamentary law. PAR'LIAMENT'ARY, a. *-mĕnt'ă-rĭ*, enacted or done by parliament; pertaining to it; according to its rules and usages. PARLIAMENTARY LAW (see PARLIAMENT, below: CONGRESS, UNITED STATES: PROCEDURE, RULES OF LEGISLATIVE AND DELIBERATIVE). PARLIAMENTARY TRAINS, in Britain, certain trains which, by enactment of parliament, are run by railway companies for conveyance of third-class passengers, free of duty, at the rate of a penny (about two cents) per mile. ACT OF PARLIAMENT, statute or law made by the three estates of the realm, which while passing through the houses, and until it has received the assent of the sovereign, is called a *bill*. RUMP PARLIAMENT, in *Eng. hist.* (1648–60), the remanent members of the Long Parliament who voted the trial of Charles I., and passed the memorable act of 1649, May, abolishing the monarchy and the house of lords (see RUMP PARLIAMENT). LONG PARLIAMENT, summoned 1640, Nov., finally expelled by Cromwell 1653, April (see CROMWELL, OLIVER).

PAR'LIAMENT [F. *parlement*—from *parler*, to talk]: supreme legislature of the united kingdom of Great Britain and Ireland. The word was applied, according to Blackstone, first to general assemblies of the states under Louis VII. in France, about the middle of the 12th c.; but in that country it came eventually to be the designation of a body which performed certain administrative functions, but whose principal duties were those of a court of justice.

The origin of the P. of England has been traced to the Saxon great councils of the nation, called 'Witenagemote,' or meeting of wise men. These had, however, little in common with the parliaments of later date: among other points of difference, they had a right to assemble when they pleased, without royal warrant. Even under the Norman kings, the Great Council formed a judicial and ministerial as well as legislative body, and it was only gradually that the judicial functions were transferred to courts of justice, and the ministerial to the privy council—a remnant of the judicial powers of P. being still preserved in the appellate jurisdiction of the house of lords. Under the Norman kings, the council of the sovereign consisted of the tenants-in-chief of the crown, who held their lands *per baroniam*, lay and ecclesiastic. It was the principle of the feudal system that every tenant should attend the court of his immediate superior; and he who held *per baroniam*, hav-

ing no superior but the crown, was bound to attend his sovereign in the Great Council or Parliament. In the charter of King John is traced for the first time the germ of a distinction between the peerage and the lesser nobility; the archbishops, bishops, abbots, earls, and greater barons being required to attend by a writ addressed to each, and the other tenants-in-chief by a general summons by the sheriffs and bailiffs. Baronial tenure originally made a man a baron or lord of parliament. When the offices or titles of Earl, Marquis, or Duke were bestowed on a baron, they were conferred by royal writ or patent, and at length barony also came to be conferred by writ instead of by tenure. During the 13th c., the smaller barons were allowed, instead of personally attending the national council, to appear by representatives; but the principle of representation seems to have been reduced to a system first when permission was given to the municipalities also, which, as corporations, were chief tenants of the crown, to appear by representatives. It is not quite clear when the division of P. into two houses took place; but when the representatives of the minor barons were joined by those of the municipalities, the term Commons was applied to both. The lower house was early allowed to deal exclusively with questions of supply; and seems, in the reign of Richard II., to have established the right to assign the supplies to their proper uses. As the commons became more powerful, they came to insist on the crown redressing their grievances before they would vote the supplies. The influence of P. was on the increase during the Tudor period, while the reign of the Stuarts was characterized by a struggle for supremacy between the P. and the crown, each striving to acquire the control of the military force of the country. The powers of the different estates came to be more sharply denied at the revolution of 1688. On the union with Scotland, the P. of England was merged into that of Great Britain. See THREE ESTATES OF THE REALM, under ESTATE.

In its early history, prior to the war of independence, the P. of Scotland had probably not been very unlike that of England; it assembled without warrant, and consisted of bishops, earls, priors, abbots, and barons. At the close of the 13th c., the constitutional history of Scotland diverges from that of England. The addition of the burghs to the national council seems to date from the beginning of the 14th c., but it was not till much later that the lesser barons began to be exempted from attendance. The first act excusing them belongs to the reign of James I. The Scottish P. was never, like the English, divided into two houses; all sat in one hall, and, though it consisted of three estates, a general numerical majority of members was considered sufficient to carry a measure. The greater part of the business was transacted by the Lords of the Articles, a committee named by the P. at the beginning of each session, to consider what

measures should be passed; and whatever they recommended was generally passed without discussion. It was never held indispensable that the P. should be summoned by the crown, and it has even been thought that the royal assent to the measures carried was not absolutely essential. The P. which carried the Prot. Reformation had no royal sanction. The Union was adjusted by commissioners for each country, selected by the crown, and passed, after strong and protracted opposition, first in Scotland, afterward more easily in England.

By the act of union with Ireland 1800, the Irish P. was united with that of Great Britain, as the P. of the united kingdom of Great Britain and Ireland. The P. of Ireland had been originally formed on the model of that of England, about the close of the 13th c.; but it was merely the very small portion of Ireland occupied by the English settlers that was represented, which, as late as the time of Henry VII., extended scarcely beyond the counties of Dublin, Louth, Kildare, and Meath, and constituted what was called the Pale (q.v.). It was only for the last few years of its existence that the Irish P. was a supreme legislature; the English P. having, till 1783, had power to legislate for Ireland. By one of the provisions of Poyning's Act, passed 1495, no legislative proposals could be made to the Irish P. until they had received the sanction of the king and council in England. An act under George III. gave the Irish P. exclusive authority to legislate for Ireland; and the abuse of this power so obstructed the machinery of government as to render the union of 1800 a necessity.

The power of P. is, according to Sir Edward Coke, so transcendent and absolute that it cannot be confined, either for persons or causes, within any bounds. All remedies which transcend the ordinary courts of law are within its reach. It can alter the succession to the throne, the constitution of the kingdom, and the constitution of P. itself. It has its own law, to be learned from the rolls and records of P., and by precedents and experience. One of the most thoroughly established maxims of this law is, that whatever question arises concerning either house of P. ought to be discussed and adjudged there, and not elsewhere. The house of lords will not allow the commons to interfere in a question regarding an election of a Scotch or Irish peer; the commons will not allow the lords to judge of the validity of the election of a member of their house; nor did either house, previous to 1868, permit courts of law to examine such cases (see *Election Petitions*, below). The authority of P. extends to British colonies and foreign possessions. In the ordinary course of govt., however, P. does not make laws for the colonies. For some, the sovereign in council legislates: others have legislatures of their own, which propound laws for their internal govt., subject to the approbation of the sovereign in council; but these may be repealed and amended by parliament.

The constituent parts of P. are the sovereign, the

house of lords, and the house of commons. In the sovereign is vested the whole executive power; the crown is also the fountain of justice, whence the whole judicial authority flows. To the crown is intrusted the permanent duty of government, to be fulfilled in accordance with the law of the realm, and by the advice of ministers responsible to P. The sovereign is invested also with the character of the representation of the majesty of the state. The sovereign's share in the legislature includes the summoning, proroguing, and dissolving of P. Parliament can assemble only by act of the sovereign; in but two instances have the lords and commons met of their own authority—viz., previously to the restoration of Charles II., and at the convention P. summoned at the revolution of 1688; and in both instances it was considered necessary afterward to pass an act declaring the P. a legal one. Though the king may determine the period for assembling P., his prerogative is restrained within certain limits. He is bound by statute (16 Chas. II. c. 1; and 6 and 7 Will. and Mary, c. 2) to issue writs within three years after the determination of a P.; and the practice of voting money for the public service by annual enactments practically renders it compulsory for the sovereign to meet P. every year. The sovereign must assemble P. within 14 days whenever the militia shall be drawn out and embodied in case of apprehended invasion and rebellion, also in case the present militia force should be raised to 120,000 men, and embodied. The royal assent is necessary before any measure can pass into law. The crown, as the executive power, is charged with management of the revenues of the state, and with all payments for the public service; it is therefore the crown that makes known to the commons the pecuniary necessities of the govt., without which no supplies can be granted. The sovereign's prerogative includes also the sending and receiving of ambassadors, entering into treaty with foreign powers, and declaring war or peace. All the kings and queens since the Revolution have taken an oath, at their coronation, 'to govern according to the statues in parliament agreed on, and the laws and customs of the same.' The sovereign is further bound to an adherence to the Prot. faith, and the maintenance of the Prot. religion as established by law. By the Bill of Rights (1 Will. and Mary, c. 2, s. 6) and the Act of Settlement (12 and 13 Will. III. c. 2, s. 2), a person professing the popish religion, or marrying a papist, is incapable of inheriting the crown, and the people are absolved from their allegiance to such a person. This exclusion is confirmed by the Act of Union with Scotland; and, in addition to the coronation oath, every king or queen is required to take the declaration against the doctrines of the Rom. Cath. Church prescribed by 30 Chas. II. c. 2, either on the throne in the house of lords, in the presence of both houses, at the first meeting of the first P. after the accession, or at the coronation—whichever event shall first happen. The sov-

ereign is bound by similar sanctions to maintain in Scotland the Prot. religion and Presb. church government.

The province of the houses of P. is to legislate with the crown, to provide supplies, to exercise a supervision over the ministers of the crown and all other functionaries, and to advise the sovereign on matters of public moment. The upper house, from its hereditary and aristocratic character, is a check on the popular branch of the legislature and on hasty legislation.

The house of lords may originate legislative measures of all kinds, except money bills. Acts of grace and bills affecting the rights of peers must originate in this house. In its judicial capacity, defined by the Appellate Jurisdiction Act 1876, it forms a court of final appeal from the highest court of appeal in England, from the court of session, Scotland, and the superior courts of law and equity of Ireland. It has a judicature in claims of peerage and offices of honor under reference from the crown. Since the union with Scotland and Ireland, it has had the power of deciding disputed elections of representative peers. It tries offenders impeached by the house of commons, and members of its own body on indictment found by a grand jury. The house of lords is composed of lords spiritual and temporal. According to a declaration of the house 1672, the lords spiritual are lords only of P., and not peers. They consist of 2 abps. and 24 bps. for England, who are said to have seats in virtue of their temporal baronies. By the act of 1869, the Irish Church, which formerly sent 4 bps., is no longer represented. The bp. of Sodor and Man has no seat in P. On Manchester being made a see 1847, it was arranged that one other bp. should have no seat, by a rotation not including the bps. of London, Durham, and Winchester, so as not to increase the number of the lords spiritual. The same rule was applied to the new sees, St. Albans, Truro, Liverpool, Newcastle, and Southwell. The lords temporal consist of: (1) The peers of England, of Great Britain, and of the united kingdom, of whom there were (1886) 6 princes of the royal blood, 21 dukes, 20 marquises, 119 earls, 28 viscounts, and 274 barons. The peers of the united kingdom may be increased without limit, by new creations, at pleasure of the sovereign. (2) 16 representatives chosen from their own body by the peers of Scotland, for each P. As no provision was made at the Union for any subsequent creation of Scottish peers, the peerage of Scotland consists exclusively of the descendants of peers existing before the Union. By order of the house of lords, an authentic list of the Scottish peers was entered on the roll of peers 1708, Feb. 12, to which all claims since established have been added; and in order to prevent the assumption of dormant and extinct peerages by persons not having right to them, a statute provides that no title standing in the roll, in right of which no vote has been given since 1800, shall be called over at an election without an order of the house of lords. (3) 28 representatives of the Irish

peerage, elected for life. Most peerages are still hereditary. Life peerages were in early times not unknown to the constitution; and, in 1876, peers to sit as members of the house during such time only as they held the office of Lords of Appeal in Ordinary were created by statute. The house has power to call also to its assistance in legal and constitutional questions the judges of the supreme court of judicature of all the four divisions, who advise what should be done. The house has power also to sit for judicial business during the prorogation of P. The votes of spiritual and temporal lords are intermixed, and the joint majority determine every question; but they sit apart, on separate benches—the place assigned to the lords spiritual being the upper part of the house, on the right hand of the throne. A peerage, whether by patent or writ, is forfeited by attainder for high treason; attainder for felony forfeits a peerage by writ, not one by patent. An attainted peerage cannot be restored by the crown, only by act of parliament.

The house of commons, besides its general power to introduce legislative measures, has sole right to originate bills levying taxes, or affecting the public income and expenditure, and to examine into the validity of elections to its own body. The question whether it has any control over the rights of electors was the subject of a memorable contest between the lords and commons 1704, in the cases of Ashby and White, and of the 'Aylesbury men' (*Hatsell's Precedents*, III.), a contest ended by the queen proroguing P. When inquiring into the conflicting claims of candidates for seats in P., the commons have an undoubted power to determine whether electors have the right to vote. The house of commons has the right to expel or commit to prison its own members, and to commit other persons who offend by breach of its privileges, contempt of its authority, disobedience of its orders, or invasion of its rights; but this power is limited to the duration of the session. Expulsion does not, however, create any disability to serve again in P. The house of commons has the power also of impeaching offenders, who, however, are tried at the bar of the house of lords.

The number of members of the house of commons has varied greatly at different times. In the reign of Edward I., it seems to have been 275; in that of Edward III., 250; and of Henry VI., 300. In the reign of Henry VIII., 27 members were added for Wales, and 4 for the county and city of Chester; 4 were added for the county and city of Durham in the reign of Charles II. Between the reign of Henry VIII. and that of Charles II., 180 new members were added by granting of royal charters to boroughs which had not previously returned representatives. 45 members were assigned to Scotland as her proportion at the Union, and 100 to Ireland, making the whole number of members of the house of commons of the united kingdom 658. The Reform Acts of 1832 and later,

while leaving unaltered the whole number of members of the house of commons, made great changes in the distribution of their seats: 56 boroughs in England and Wales were entirely disfranchised; 30 which had previously returned two members were restricted to one; while 42 new boroughs were created. Four members were assigned to the City of London, 2 to each of the universities of Oxford and Cambridge, and one to 133 cities and boroughs. The number of members for Scotland was increased from 45 to 53. The number for Ireland was increased from 100 to 105, 64 representing counties, 34 cities and boroughs, and 2 the University of Dublin. Further changes in the distribution of seats were made by the Reform Acts of 1867 and 8. The English act deprived of its second member each borough of less than 10,000 inhabitants, an altogether disfranchised seven boroughs: giving 45 seats for redistribution, of which 25 were given to the larger counties, 11 to new boroughs, 8 to boroughs already represented, and 1 to the Univ. of London. The totals of members and registered electors, 1906, are as follows: *Counties*—England, 253 members, 3,344,282 electors; Scotland, 39 members, 426,325 electors; Ireland, 85 members, 573,066 electors; total for counties, 377 members and 4,338,173 electors. *Boroughs*—England, 237 members, 2,461,890 electors; Scotland, 31 members, 307,400 electors; Ireland, 16 members, 113,595 electors; total for boroughs, 284 members and 2,882,288 electors. *Universities*—England, 5 members, 18,712 electors; Scotland, 2 members, 21,676 electors; Ireland, 2 members, 4,762 electors; total for universities, 9 members and 45,150 electors. *Aggregate*—670 members and 7,266,708 electors.

The Representation of the People Act 1884, and the Distribution of Seats Act 1885, have effected greater change in the number of electors in the united kingdom and the arrangement of the constituencies than any previous reform bill. The Reform Bill 1832 added less than 300,000 voters to the electorate: the reform of 1867–8 increased the electorate from 1,136,000 to 2,448,000. At the passing of the last Franchise Act, the electorate had by natural growth risen to about 3,000,000 and that act has added about 4,500,000 to the list of voters.

The new Franchise Act had its root in the household suffrage established 1867 and 8. Before the passing of the new act, the borough franchise was of three kinds: the £10 occupation franchise: the household franchise: and the lodger franchise (the lodgings being worth £10 a year unfurnished). These were recognized by the act of 1884, which added to them a fourth, the 'service' franchise—namely, that every man who inhabits a house by virtue of office, service, or employment, if the house is not inhabited by his employer also, is henceforward entitled to vote as a householder (a class including many officers of public establishments, bailiffs, gamekeepers, shepherds and farm servants). These four franchises

in boroughs were now extended to the counties also. All persons, either in boroughs or counties, may now claim to be registered as voters in respect of a £10 clear annual value qualification, applying to the occupation of land, with or without buildings; but the vast majority of electors, old and new, will, both in boroughs and in counties, be registered as rated occupiers simply. Under the former acts, those ratepayers who had not paid their poor rates before the 31st of July of any year were thereby disqualified as voters, and their names struck off the roll of voters for the ensuing year. The new act maintains the same disqualification in the case of those householders who are rated individually for the poor's tax; but to those who are registered under the 'service' clauses, or who are otherwise not rated for the poor's tax, the above disqualification does not, of course, apply. The extension of the franchise applies equally to Scotland and Ireland, the only difference being in details. The right of voting is thus placed on a broad and intelligible basis, and is now common in the same degree to all parts of the united kingdom. The old property franchises in the counties, though practically superseded, are left in the main untouched. Some provision is made against 'faggot votes' in the cases of rent-charge and joint ownership.

Before the passing of the Distribution of Seats Act 1885, the proportion of members to population was, on an average, 1 to 54,000. The Seats Act merged in the counties all English towns of less than 15,000 inhabitants, together with certain others that had been guilty of bribery; reduced by one the representation of certain boroughs and counties; allotted one member to boroughs of pop. between 15,000 and 60,000; for towns up to 165,000 allowed two members; and to those above that limit gave from one to six additional members. The act further adds 12 members to the house of commons, increasing the full number from 658 to 670. The 12 new members go to increase the representation of Scotland from 60 to 72; 2 Irish seats are disfranchised, and go to English constituencies; the representation of Wales is unaltered. In all, 120 seats were abolished—81 boroughs in England (15 of these having heretofore 2 members, the rest 1 each), 2 groups of boroughs in Scotland, and 22 Irish boroughs ceasing hereafter to send members to parliament as distinct constituencies. The electors of such boroughs are not, of course, disfranchised, but will now vote in the county district into which the borough has been thrown; and the county districts are in many cases named after these once parliamentary boroughs. Next, 36 English boroughs, 2 English counties (Rutland and Hereford), 3 Irish boroughs, and 1 Irish county lose 1 member each, while the City of London (in the narrowest sense, as distinguished from the metropolis at large) is to send 2 instead of 4 representatives; thus 44 seats became available for redistribution. Collectively, 164 seats were set free. Of

these, the greater part were given to existing boroughs and counties. But 6 English boroughs, not metropolitan, were made parliamentary boroughs; while the metropolitan boroughs are increased from 9 to 29 (including Croydon and West Ham, both without the limits of the Metropolitan Board of Works), and have, with the City of London, 62 members in all. Of existing borough constituencies, other 12 large English cities received additional members; as also 3 Scottish and 2 Irish cities. An important feature of the act is that, as a general rule, both counties and boroughs are broken up into one-member electoral districts. Thus, the 26 members for Yorkshire and the 23 for Lancashire sit each for a separate electoral district; and so with the 9 members for Liverpool, the 7 for Birmingham, the 6 for Manchester, the 7 for Glasgow, the 4 for Edinburgh, etc. The City of London and towns between 50,000 and 165,000 inhabitants continue, however, to be represented each by two members conjointly. To suit them to the distribution measure, the boundaries of the new electoral districts have been carefully defined, and those of the old constituencies altered where necessary.

As to membership in P., Scotch peers, though not representative peers, are disqualified from sitting in the house of commons. Irish peers may represent any constituency in Great Britain, but not in Ireland. A disqualification is attached also to judges (except the master of the rolls), to clergymen of the Established Church of England or of Scotland, Rom. Cath. priests, revenue officers, persons convicted of treason and felony, and to aliens, even when naturalized, unless the right have been conceded in express terms. Government contractors are disqualified. A member becoming bankrupt is incapacitated from sitting or voting.

When a new P. has to be assembled, the lord chancellor, by order of the sovereign, directs the clerk of the crown to prepare and issue, under the great seal, writs to the sheriffs of counties, both for the counties and the boroughs; and the sheriff of each county appoints a day for the election in that county. The candidates are nominated by a writing signed by two electors, as proposer and seconder, and eight others, as consenting, and delivered to the returning officer. If, on expiry of an hour from the time fixed, there are more candidates than vacancies, the election is adjourned, and a poll taken. The vote is given by Ballot (q.v.), and the result announced by the returning officer, and returned to the clerk of the crown in chancery. Vacancies occurring after a general election are supplied by new writs issued by authority of the house.

A member of the house of commons cannot, in theory, resign his seat; but, in practice, ways are provided for evasion of this principle. When a member is elected to any office of profit under the crown, his election is declared void. A member wishing to resign usually applies for the stewardship of the Chiltern Hundreds (q.v.).

Privilege.—Both houses of P. possess extensive privileges for maintenance of their authority and protection of individual members. Some of these privileges have well-defined limits; others are so vague in their extent as occasionally to lead to conflicts between P. and the courts of law. The privilege of speech is claimed of the sovereign by the speaker of the house of commons at the opening of every new parliament. At the same time, any member using offensive expressions may be called to the bar to receive a reprimand from the speaker; or, if the offense be grave, may be committed for contempt, in which case he is sent either to the Tower or to Newgate. Persons not members of the house also may be committed for breach of privilege, and no one committed for contempt can be admitted to bail, nor can the cause of commitment be inquired into by the courts of law. The publication of the debates of either house has repeatedly been declared a breach of privilege; but for a long time this privilege has been practically waived, except where the reports are false and perverted. Publication of the evidence before a select committee previously to its being reported is punished as a breach of privilege. Libellous reflections on the character and proceedings of P., or of members of the house, come under the same category, as also does assaulting or threatening a member. Wilful disobedience to the orders of the house is punishable as a breach of privilege; but if orders be given beyond the jurisdiction of the house, their enforcement may be questioned in a court of law. The offer of a bribe to, or its acceptance by, a member is a breach of privilege; so also is any interference with the officers of the house in the execution of their duty, or tampering with witnesses who are to be examined before the house or a committee of the house. Members of both houses are free from arrest or imprisonment in civil matters—a privilege permanent in the case of peers, extending also to peeresses, whether by creation or marriage (though the latter lose it by subsequently marrying a commoner), and to peers and peeresses of Scotland and Ireland, whether representative or not. It continues in the case of members of the house of commons during the sitting of P., for 40 days after each prorogation, for 40 days prior to the day to which P. is prorogued, and for a reasonable time after a dissolution. Witnesses summoned to attend before P. or parliamentary committees, and other persons in attendance on the business of P., also are protected from arrest. Protection is not claimable from arrest for any indictable offense. Counsel are protected for any statements that they may make professionally.

Meeting of a New Parliament.—On the day appointed for meeting of a new P., the members of the two houses assemble in their respective chambers. In the lords, the lord chancellor acquaints the house that 'his [or her] majesty, not thinking it fit to be personally present here this day, has been pleased to cause a commission to be

issued under the great seal, in order to the opening and holding of the parliament.' The lords commissioners, being in their robes, and seated between the throne and woolsack, then command the gentleman usher of the black rod (see BLACK-ROD) to let the commons know that 'the lords commissioners desire their immediate attendance in this house, to hear the commission read.' Meantime, in the lower house, the clerk of the crown in chancery has delivered to the clerk of the house a list of the members returned to serve; and, on receiving the message from Black-rod, the commons go up to the house of lords. The commission having been read in presence of the members of both houses, the lord chancellor opens the parliament by stating that 'his [or her] majesty will, as soon as the members of both houses shall be sworn, declare the causes of his calling this parliament; and it being necessary that a speaker of the house of commons should first be chosen, that you, gentlemen of the house of commons, repair to the place where you are to sit, and there proceed to the appointment of some proper person as your speaker, and that you present such person whom you shall so choose here to-morrow at — o'clock, for his [or her] majesty's royal approbation.' The commons immediately withdraw, and, returning to their own house, proceed to elect a speaker.

Till a speaker be elected, the clerk acts as speaker, standing, and pointing to members as they rise to speak, and then sitting down. If only one candidate be proposed for the office, the motion, after being seconded, is supported by an influential member, generally the leader of the house of commons; and the member proposed, having expressed his sense of the honor meant to be conferred on him, is called by the house to the chair, to which he is led by his proposer and seconder. If another member be proposed and seconded, a debate ensues; and, at its close, the clerk puts the question, that the member first proposed 'do take the chair of the house as speaker.' If the house divide, he directs one party to go into the right lobby, and the other into the left, and appoints two tellers for each—this being the usual mode of taking a vote by division. If the majority be in favor of the member first proposed, he is led to the chair; if not, a similar question being put regarding the other member, and answered in the affirmative, he is conducted to the chair. The speaker-elect expresses his thanks for the honor conferred on him, and takes his seat; on which, the mace is laid on the table, where it is always placed during the sitting of the house with the speaker in the chair. He is then congratulated by some leading member, and the house adjourns. The next day, the speaker-elect, on the arrival of Black-rod, proceeds with the commons to the house of lords, where his election is approved by the lord chancellor. He then lays claim, on behalf of the commons, to their ancient rights and privileges; which being confirmed, he retires

with the commons from the bar. Nearly the same forms are observed on the election of a new speaker, when a vacancy occurs by death or resignation in the course of the session.

The members of both houses then take the oath prescribed by law: see OATH: ABJURATION. In the upper house, the lord chancellor first takes the oath singly at the table. The clerk of the crown delivers a certificate of the return of the Scottish representative peers, and Garter King-at-Arms (q.v.) the roll of the lords temporal, after which the lords present take and subscribe the oath. Peers newly created by letters patent present their patents to the lord chancellor, are introduced in their robes between two other peers of their own dignity, preceded by Black-rod and Garter, and conducted to their places. Similar ceremony is observed in the case of peers who have received a writ of summons. A bishop is introduced by two other bishops, without the formalities observed with temporal lords. Peers by descent have a right to take their seats without introduction. When the greater part of the members of both houses have been sworn, the causes of calling the P. are declared by the sovereign, either in person or by commission. In the former case, the sovereign proceeds in state to the house of lords, and commands Black-rod to let the commons know that 'it is his [or her] majesty's pleasure that they attend him immediately in this house.' Black-rod proceeds to the house of commons, and formally commands their attendance, on which the speaker and the commons go up to the bar of the house of lords, and the sovereign reads his speech, which is delivered to him by the lord chancellor kneeling on one knee. Of late years, the practice has been revived of the lord chancellor reading the royal speech in the sovereign's presence. When P. is opened by commission, the sovereign not being personally present, the lord chancellor reads the royal speech to both houses. Immediately after the royal speech is read, the house is adjourned during pleasure; but both houses are resumed in the afternoon, for the purpose of voting an address in answer to the speech from the throne. In each house it is common to begin business by reading some bill *pro forma*, in order to assert the right of deliberating without reference to the immediate cause of summons. The royal speech is then read, and an address moved in answer to it. Two members in each house are chosen by the ministry to move and second the address. The preparation of the address is referred to a select committee; it is twice read, may be amended, and, when finally agreed on, it is ordered to be presented to the sovereign.

Adjournment, Prorogation, and Dissolution.—Adjournment of P. is but the continuance of the session from one day to another. A prorogation differs from an adjournment in this respect, that it not merely suspends all business, but quashes all proceedings pending at the

time, except impeachments by the commons, and appeals and writs of error in the lords. It being a rule that a bill of the same substance cannot be introduced twice in the same session, a prorogation has sometimes been resorted to, to enable a second bill to be brought in. P. can be prorogued only by the sovereign.

P. comes to an end by dissolution. This dissolution may be by the will of the sovereign expressed in person or by representatives. Having been first prorogued, it is dissolved by a royal proclamation, and by the same instrument it is declared that the chancellor of Great Britain and chancellor of Ireland have been respectively ordered to issue writs for calling a new parliament. By the Reform Act of 1867, the P. in being at any future demise of the crown shall not be determined by such demise, but shall continue as long as it would otherwise have continued unless dissolved by the crown. Were the power of dissolving the P. not vested in the executive, there would be danger of its becoming permanent, and encroaching on the royal authority, so as to destroy the balance of the constitution. An example of this danger is shown in the Long Parliament (1640, Nov.—1653, Apr.), to which Charles I. conceded that it should not be dissolved till such time as it dissolved itself, and which Oliver Cromwell found it necessary to dissolve and expel by force. If the houses of P. encroach on the executive, or act factiously or injudiciously, the crown may, by a dissolution, bring their proceedings to an end, and appeal to the people by sending the members of the house of commons to give an account of their conduct to their constituents. There was originally no limit to the duration of a P. except the will of the sovereign; but the term has been extended to seven years. The practice of granting the Mutiny Act and the Budget for a year only now makes it necessary that P. should assemble annually.

Conduct of Business.—Some points of interest, including variations from ordinary rules of procedure in deliberative bodies, are here noted. Each house is presided over by its speaker. The speaker of the house of commons does not take part in debate, offer his opinion, or vote on ordinary occasions; but, in case of equality, he has a casting-vote: his duty is to decide all questions which relate to order, putting the matter at issue in a substantive form for the decision of the house, if his own decision is not assented to. He explains any doubts that may arise on bills. He determines the precedence of members rising to address the house. He examines witnesses at the bar. At the close of the session, he addresses the sovereign, on presenting the money-bills passed during the session for the royal assent. He nominates the tellers on a division, and makes known the votes to the house. He may commit members to custody during the pleasure of the house—a confinement which terminates with the close of the session. When a vacancy occurs by death, he signs the warrant to the

clerk of the crown to make out the writ for the election of a new member. He audits the accounts of the receiver of fees, and directs the printing of the votes and proceedings of the house. The lord chancellor, or lord keeper of the great seal, is the speaker of the house of lords; in his absence, the chairman of the committee of ways and means takes the chair. The speaker is not, as in the lower house, charged with maintenance of order, or the decision who is to be heard: these rest with the house itself. Each house has its *Standing Orders*, or regulations, adopted at different periods; relating partly to internal order, partly to certain preliminaries required in the introduction of bills and promulgation of statutes.

The house of lords usually meets at 5 P.M.; the commons at a quarter before 4 P.M., except on Wednesdays and other days specially appointed for morning sittings. In the lords, the chancellor, as speaker, sits on the woolsack. A standing order, never enforced, requires the lords to take place according to precedence. Practically, the bishops sit together on the right hand of the throne; the members of the administration, on the front bench on the right hand of the woolsack, adjoining the bishops, and the peers who usually vote with them occupy the other benches on that side. The peers in opposition are ranged on the opposite side, and those considered politically neutral occupy the cross-benches between the table and the bar. In the house of commons, the front bench on the right hand of the chair is reserved for the ministry, and called the Treasury Bench, the front bench on the opposite side being occupied by the leaders of the opposition. By ancient custom and orders of both houses, rarely enforced, strangers are excluded while the houses are sitting.

Prayers are read before business is begun—in the house of lords by a bishop; in the house of commons by the chaplain. Every member is bound to attend the house—in the lower house, personally; in the upper, personally or by proxy; but in ordinary circumstances this obligation is not enforced. The house of lords may proceed to business when three peers are present; in the commons, 40 members are required to constitute a house for the dispatch of business. The speaker counts the house at four; and if that number be not then present, or if it be noticed, or appear on a division, that fewer than 40 members are present, the house is adjourned. A call of the house is an expedient to secure attendance on important occasions; when it is made, members absent without leave may be ordered to be taken into custody. When matters of great interest are to be debated in the upper house, the lords are 'summoned.'

To make a motion, or, more properly, to *move the house*, is to propose a question; and notices of motions should be given on a previous day. The commons are in the practice of setting apart Mondays, Wednesdays, Thursdays, and Fridays for considering *orders of the day*, or

matters which the house had already agreed to consider on a particular day, and of reserving Tuesdays for motions. Government orders take precedence of others on all order days except Wednesdays, which are generally reserved for the orders of independent members. A seconder is not required in the house of lords, nor in committee of the whole in either house. The procedure in *moving the previous question* is as follows: The act of the speaker in putting the question is intercepted by a motion, 'that the question be now put.' The mover and seconder of this motion vote against it; and if it be resolved in the negative, the speaker is prevented from putting the main question, which, however, may be brought forward on another day. The 'previous question' is not allowed in committee of the whole. The speaker of the commons, who does not otherwise vote or take part in a debate, has a casting-vote in case of equality. In the house of lords, the speaker is, on the other hand, not disqualified from taking part in a debate; he votes on divisions, but has no casting-vote; and on an equality the 'non-contents' (noes) prevail. In debate, a member of the commons addresses the speaker; a member of the upper house, the lords collectively; in both cases, standing and uncovered. The speaker's *naming* a member to the house is an old-established form of censure.

New Procedure Rules.—Incessant obstruction of business in the house of commons, by the concerted and systematic action of the Irish parliamentary party, led, 1882, to the proposal by govt. of a series of new rules for procedure, which were adopted after long debate. Of the 13 resolutions passed, 10 were straightway made into standing orders. Henceforth, when it appears to the speaker or chairman that a subject has been adequately discussed, and that this is the evident sense of the house, he may inform the house to that effect; and a motion 'that the question be now put' shall be carried if supported by more than 200 members (changed 1888 to 100), or if opposed by less than 40 and supported by more than 100. Motions for adjournment may be used for discussion of a definite matter of urgent public importance if 40 members stand up in favor of this course. Provision is made in that case for limiting debate to the subject in hand. Some new arrangements are made for taking divisions, and technical directions are supplied for guidance of speaker or chairman. No opposed motion shall be taken after half-past twelve. Regulations are laid down for suspension of offending members. The speaker or chairman is invested with large discretionary powers for checking attempts to secure delay by abuse of the rules. At the same time, rules were adopted relating to the appointment or working of standing committees or grand committees, as an experimental means of assisting the house to proceed more expeditiously through its work, which had latterly fallen far into arrears. See CLOSURE.

Bills.—The principal business which occupies both houses is the passing of bills. In early times, laws were enacted in the form of petitions from the commons, which were entered on the rolls of parliament, with the king's answers subjoined; and, at the close of the session, these imperfect records were drawn up in the form of a statute, which was entered on the statute rolls. Bills in the form of complete statutes were introduced in the reign of Henry VI. Bills may originate in either house; but the exclusive right of the commons to deal with all legislation regarding taxes or supplies makes it necessary and expedient that by far the greater part of both public and private bills, except such as are purely personal, should originate in the lower house. One description of act alone originates with the crown—an act of grace or pardon. It is read only once in each house, and cannot be amended, but must be accepted in the form in which it is received from the crown, or rejected. Bills that relate to religion, trade, grants of public money, or taxation, are required to be introduced by the house itself, on the report of a committee of the whole house. A bill is read a first, second, and third time; the first time usually by its short title, as entered in the orders of the day and indorsed on the bill. A day is then appointed for considering the question, 'that the bill be read a second time,' allowing a sufficient interval to elapse to let it be printed and circulated. The time of moving the second reading is the usual time for opposing a bill whose general principle is disapproved. At the third reading, the entire measure is reviewed; and no amendments, except what are verbal, can then be made; and the question is put to the house, 'that this bill do now pass.' The bill, when passed by the commons, is sent to the lords, where it goes through the same forms; if rejected, no further notice is taken of it; if passed with amendments, it may become the subject of conference between the two houses; but reasons for disagreement from amendments are now frequently communicated by messages, without a conference. The same forms are gone through when a bill originates in the house of lords. The official record of the assent of one house to the bills passed or amendments made by the other is an indorsement on the bill in Norman French. Thus, when a bill is passed by the commons, the clerk of the house writes on the top of it, 'Soit baillé aux seignieurs.' When the lords make amendment to a bill, it is returned with the indorsement, 'À ceste bille avesque des amendments les seignieurs sont assentus.' When it is sent back with these amendments agreed to, the clerk of the house of commons writes, 'À ces amendments les Communes sont assentus.' When both houses have agreed to a bill, it is deposited in the house of lords, to await the royal assent, unless it be a money-bill, which is sent back to the commons.—In private bills, the functions of P. partake of the judicial as well as

the legislative character; and the rules are framed to require deliberate examination and consideration of each case. In recent times, the necessity for obtaining private acts has been, in many cases, obviated by general laws adapted to different classes of objects.

Royal Assent.—A bill becomes a statute or act of P. on receiving the royal assent, which is given in the house of lords, the commons being also present at the bar. It is given in either of two ways: by letters patent under the great seal, signed by the sovereign's own hand, and communicated to the two houses by commissioners; or by the sovereign present in person in the house of lords. When the royal assent is given by commission, three or more of the lords commissioners command Black-rod to signify to the commons that their attendance is desired, on which the commons, with the speaker, immediately come to the bar. The commission is then read at length; and the titles of all the bills being read by the clerk of the crown, the royal assent to each is signified by the clerk of the parliaments in Norman French, and so entered on the lords' journals. In assenting to a public bill, the words used are: 'Le roy [la reyne] le veult;' to a private bill: 'Soit fait comme il est desiré;' and to a bill of supply (which is presented by the speaker, and receives the royal assent before all other bills): 'Le roy remercie ses bons sujets, accepte leur benevolence, et ainsi le veult.' The refusal of the royal assent is announced by the words, 'Le roy s'avisera.' But the necessity for such refusal is generally removed by the observance of the constitutional principle that the sovereign has no will but that of the ministers, who continue in office only so long as they have the confidence of parliament. The last instance in which the royal assent was refused was by Queen Anne 1707. The royal assent is seldom given in person, except at close of a session, when the sovereign attends to prorogue parliament, and then signifies the royal assent to such bills as have been passed since the last commission was issued; but bills providing for the honor and dignity of the crown, and bills for settling the civil lists, have generally been assented to by the sovereign in person immediately after they have passed both houses. When the royal assent is given in person, the clerk of the crown reads the titles of the bills; and the clerk of the parliaments, who has previously received the sovereign's commands in the robing-room, makes an obeisance to the throne, and signifies the royal assent, as already described, the sovereign giving a gentle inclination.

Supplies.—Prior to 1688, in addition to parliamentary taxation, imposts were levied sometimes by an exercise of the royal prerogative. Since the Revolution, no taxes have been raised otherwise than by parliamentary authority. The commons have the exclusive right to impose taxes and vote money for the public service. The lords cannot even make an alteration in a bill of supply,

except to correct a clerical error. The lords are not even entitled to insert in a bill any pecuniary penalties, or to alter the amount or application of any penalty imposed by the commons—a rule whose rigid assertion has been found to be attended with so much inconvenience that there has latterly been a disposition to relax it. But though the commons have exclusive right to grant supplies, a grant requires the ultimate assent of the sovereign and the house of lords.

The public revenue of the crown is derived in part from permanent charges on the consolidated fund, and in part from actual grants for specific public services, which require the yearly sanction of parliament. The sovereign having demanded from the commons the annual provision for the public service, and directed the estimates to be laid before them, the house in due time resolves itself into a 'committee of supply.' When the first report of the committee of supply has been received and agreed to, a day is appointed for the house to resolve itself into a 'committee of ways and means.' This committee is not appointed till a sum has been voted by the house, nor is it afterward allowed to vote in excess of the expenditure voted by the committee of supply. It is the function of the committee of supply to consider what specific grants are to be voted, and of the committee of ways and means to determine how the funds shall be raised which are voted by the committee of supply. Without special parliamentary authority, the consolidated fund could not be applied to meet the supplies voted for the service of the year; but to make it so available, the committee of ways and means votes general grants from time to time out of the consolidated fund, 'toward making good the supply granted to his [or her] majesty;' and bills are founded on the resolutions of the committee, by which the treasury receives authority to issue the requisite amount from the consolidated fund for the service of the year. When the committee of supply has determined the number of men that shall be maintained during the year for the army and sea service, and its resolutions have been agreed to, the *Mutiny Bill* and *Marine Mutiny Bill* are brought in, providing respectively for the discipline of the troops and marines when on shore. Apart from this annual sanction, the maintenance of a standing army in time of peace would be illegal, and the army and marines would be relieved from all martial discipline. The committee of ways and means receives the annual financial statement, popularly called the *Budget*, from the chancellor of the exchequer. That minister gives a general view of the resources of the country and of the financial policy of the government, and presents a probable estimate of income and expenditure for the twelve months ending Apr. 12 of the following year. He states what taxes he intends to reduce, and what new ones he means to impose, and ends by proposing resolutions for the adoption of the committee, which, when reported to the

house, form the ground-work of bills for accomplishing the financial objects proposed. The resolutions of the committee of ways and means are carried into effect by the Consolidated Fund Bill, or, as it is often called, the *Appropriation Bill.*

Communications with the Crown.—Besides at the opening and proroguing of parliament, and giving of the royal assent, there are other occasions on which the crown communicates with parliament by a *message,* under the sign-manual, to either house singly, or both houses separately. Messages are brought by a member of the house, being a minister of the crown, or one of the royal household, and may relate to important public events, the prerogatives or property of the crown, provision for the royal family, etc. An *address* is the mode in which the resolutions of parliament are communicated to the crown. Addresses may be joint, of both houses, or separate, of either house.

Election Petitions.—By the Parliamentary Elections Act, 1868 (31 and 32 Vict. c. 124), election petitions are now presented to the court of common pleas in Westminster or Dublin, or the court of session in Scotland, and tried by a single judge appointed by the court and sitting in the borough or county whose election is contested. An election petition must be signed by some person who voted, or had a right to vote, at the election, or by some person who claims to be returned, or alleges himself to have been a candidate, and presented within 21 days after the return objected to, or, if it proceeds on the allegation of bribery, within 28 days after the alleged payment. Security is to be found for costs to the extent of £1,000, either by sureties not exceeding four, or by a deposit of money, or partly in each way. The judge determines whether the member was duly elected, and certifies to the speaker his determination, which is final. Should the petition allege corrupt practices, the judge shall report also to the speaker whether there has been any corrupt practice within the knowledge and consent of any candidate, the names of persons proved guilty, and whether corrupt practices have prevailed extensively at the election: also, the judge may specially report any matter for consideration of the house of commons. Where, on application of any party to a petition, it appears that the case raised can be conveniently stated as a special case, it may be so stated and determined by the court, who certify their decision to the speaker, which is final. An election petition cannot be withdrawn without leave of the court or judge, on special application; and a person who might have been a petitioner may apply to be substituted for the person withdrawn. The court or judge is to report to the speaker whether, in his opinion, the withdrawal of the petition has been induced by any corrupt arrangement. To these determinations by the judge, the house gives effect by issue of new writs, or otherwise. But the

house still retains and exercises its jurisdiction in all cases not relegated by statute to the judges.

Under the Corrupt Practices Prevention Act, 1883, offenses are classified as Corrupt Practices and as Illegal Practices. *Corrupt Practices* include: (1) Treating; (2) Undue Influence; (3) Bribery; (4) Personation, or aiding, abetting, counselling, or procuring the same; and (5) Knowingly Making a False Declaration Respecting Election Expenses. 'Treating' is defined as the providing, directly or indirectly, before, during, or after an election, any meat, drink, or other entertainment to or for any person, in order to influence that or any other person either to vote or to refrain from voting at the election. Any elector who corruptly takes such entertainment will be guilty also of a corrupt practice. 'Undue influence' is the direct or indirect use or threatening of force or restraint, or the infliction of injury, in order to induce or compel any person to vote or to refrain from voting, or on account of his having voted or refrained at any election. Treating, undue influence, and bribery are misdemeanors punishable with a year's imprisonment or a fine of £200. Personation is a felony, and is punishable with two years' imprisonment with hard labor. Moreover, persons found guilty of any of these offenses are disqualified for seven years from sitting in P., or voting at any election, or holding any public or judicial office.

Illegal practices include *payment* for the conveyance of voters to or from poll, for exhibiting bills or notices by an elector, for committee-rooms in excess of the number allowed by statute, of money except through election agent, of election expenses after time limited for payment; also voting or inducing a person to vote when disqualified, publishing a false statement of the withdrawal of a candidate, and incurring expenses beyond the maximum allowed by the act. The punishment attached is a fine not exceeding £100, and disqualification for voting at any election in the county or borough for five years. If a candidate is himself guilty, his election will be void, and he shall be incapable of sitting for that constituency for seven years. A list of persons incapacitated from voting, for *corrupt* or *illegal* practices, must be made up annually by every county and borough assessor, specifying names and offenses, and this list must be published with the register of electors.

An election is not to be void where an election court exonerates the candidate personally, but finds his agent guilty of treating, or undue influence, or illegal practice of a trivial character. Further, the election court, if satisfied that an act or omission of a candidate, in itself an illegal practice, payment, or employment, arose from inadvertence and not from bad faith, may order such to be an 'exception' from the provisions of the act, and relieve the person involved from the statutory consequences.

The limits of election expenditure, other than per-

sonal expenses and returning officers' charges, are stringently fixed at £350 in boroughs and £650 in counties, if the number of electors does not exceed 2,000; the scale rising £30 in a borough and £60 in a county, for every 1,000 electors above 2,000. The maximum of payment for miscellaneous matters must not exceed £200, and must not be incurred in any manner involving an offense.

A candidate must have one election agent only, who must be declared to the returning officer before the nomination day, one subagent for each polling district in counties, and one polling agent in each polling station. In a borough, he may not have more than one clerk and one messenger for every 500 electors; and in a county, for the central committee-room, he may not employ more than one clerk and one messenger for every 5,000 electors. Also for each polling district in counties he may employ one clerk and one messenger for every 500 electors in the district. No one employed in any capacity who is paid for his services may vote.

Every claim respecting election expenses is to be barred and not paid unless sent to the election agent within 14 days after declaration of poll; and all election expenses incurred are to be paid within 28 days after declaration of poll. The return respecting election expenses is, moreover, to be transmitted by the election agent to the returning officer within 35 days after the declaration of the poll, and the returning officer must publish such return of election expenses within 10 days after receiving it, in at least two newspapers circulating in the electing county or borough, together with a notice of time and place where the same may be inspected.

Impeachment.—There are instances as far back as the times of the Plantagenet princes of the supreme power of parliament being exercised to punish offenses where something extraordinary in the nature, or some unforeseen obstacle to the execution, of the ordinary laws was deemed to render this advisable. This was done by a bill of attainder, which in the reign of Henry VIII. became the usual mode of proceeding against state offenses. A bill of attainder sometimes followed a regular trial and conviction, as in the case of Empson and Dudley, but was often passed without trial, examination of witnesses, or hearing the accused party, as in the attainder of Fisher and Sir Thomas More. Bills of attainder were sometimes, but rarely, had recourse to under the Stuart kings; the last instance was the case of Sir John Fenwick 1696. The practice of impeachment of extraordinary offenders before the lords by the commons, which had been frequent during the 14th and 15th c., was revived in the reign of James I. This proceeding is not, like bills of attainder or pains and penalties, the making of a new law *pro re nata*, but a carrying out of the already known and established law. The great representative inquest of the nation first find the crime, and then, as prosecutors, support the charge before the high-

est court of criminal jurisdiction. It has always been allowed that a peer may be impeached for any crime, whether cognizable by the ordinary courts or not. The right of the commons to impeach a commoner of a capital offense, at one time doubted, has been solemnly affirmed by the house of lords. The trial is conducted by managers for the commons. Witnesses are summoned by the lords at the desire of the commons, and Westminster Hall has usually been the place of trial, the lord high steward presiding. The managers make their charges, and adduce evidence; the accused answers, and may defend himself by counsel; and the managers have a right to reply. In giving judgment, the question is put by the lord high steward to each peer, beginning with the junior baron, on each article separately, whether the accused be guilty. The answer is, 'Guilty, on my honor,' or 'Not Guilty, on my honor,' the lord high steward giving his opinion the last; and, the numbers being cast up, the accused is acquainted with the result. Impeachments have not been common in later times, though they are still a competent proceeding; the latest memorable cases are those of Warren Hastings 1788 and Lord Melville 1805.

Trial of Peers.—Peers are, in all cases, tried by their peers for treason, misprision of treason, felony, or misprision of felony. For misdemeanors, however, they are tried before the ordinary courts of law; and the lords spiritual are in all cases tried before the ordinary courts of the country. During the sitting of parliament, the trial proceeds before the house of lords, or, more properly, before the court of P., presided over by the lord high steward. When P. is not sitting, the trial takes place before the court of the lord high steward. A peer is liable, on conviction, to the same punishment as any other of the lieges.

See Sir T. Erskine May's *Laws, Privileges, Proceedings, and Usage of Parliament* (new ed. 1879); Lucy's *Parliamentary Procedure* (1880); Walpole's *The Electorate and the Legislature* (1881).—See CONGRESS, UNITED STATES.

PARLIAMEN'TARY CHURCH: in England, a church erected under authority of an act of parliament; generally called a district church. Acts of parliament authorizing such churches are known as the Church Building Acts: see PARISH. In Scotland, similar churches are called *Quoad Sacra* churches.

PARLINE, n. *pâr'līn* [Eng. *par* and *line*]: the mean or normal line of a barometer for a given station.

PARLOR, n. *pâr'lẽr* [OF. *parleor;* F. *parloir*, the room in a nunnery where the nuns were allowed to speak to visitors through a grating—from F. *parler;* It. *parlatorio*—from It. *parlare*, to speak]: an apartment in a house used as a sitting-room or for common receptions. PARLOR BOARDER, a scholar in a boarding-school who takes meals with the master's family.

PARLOUS, a. *pâr'lŭs:* OE. for PERILOUS; also acute, shrewd.

PARMA, *pâr'mâ:* province, formerly a sovereign duchy of Italy, between the Apennines and the Po, touching Sardinia (Piedmont) on the w. and Modena on the e. It comprised, at its annexation to the kingdom of Italy, the two duchies of Parma and Piacenza (2,270 sq. m.; pop. 490,000). The form of government was monarchical, and administrative power was in the hands of a council of state. The revenue was about $2,250,000. The Apennines, which cross the s. division of the duchies, send off spurs northward; the n. is an undulating plain, sloping to the Po. The highest peaks in P. rise about 7,000 ft. The mountain range is richly clad with oak and chestnut forests. The plain is very fertile, producing rich crops of grain (including rice), leguminous plants, fruits of all kinds, olives, and grapes: marble, alabaster, salt, and petroleum are chief mineral products. Agriculture, silk-working, cattle-breeding, and cheese-making are principal employments. Silk and cheese are chief exports. The cheese, however, known as Parmesan, is made, not in P., but near Lodi (q.v.).

History.—P. and Piacenza belonged in the time of the Roman empire to Cisalpine Gaul, and after its fall came under the rule of the Lombards, to whose rule succeeded that of the kings of Italy and the German emperors. In the 12th and following centuries, they joined the other territories of n. Italy, which were struggling for independence, and consequently became involved in the Guelf and Ghibelline contests. Weakened by these strifes, they fell under the domination of the powerful houses of Este, Visconti, and Sforza; but 1499 they passed under the yoke of the French monarch, Louis XII., from whom they were soon recovered by Emperor Maximilian, and handed over to Pope Leo X. 1513. They continued under the sovereignty of the popes till 1543, when they were alienated by Pope Paul III., and with the surrounding territory were erected into a duchy for his natural son Pietro Luigi Farnese, grandfather of Alessandro Farnese, celebrated regent of the Low Countries. On the extinction of the male line of Farnese, 1731, by the death of the eighth duke, Antonio, his niece Elizabeth, queen of Philip V. of Spain, obtained the duchies for her son Don Carlos, who, however, exchanged them 1735, with Austria, for the throne of the Two Sicilies. In 1748 they were restored with Guastalla to Spain, and became a duchy for the Infante Don Philip, with a reversion to Austria in case of failure of his male descendants, or of any of them ascending the Spanish or Neapolitan throne. Philip was succeeded 1765 by his son Ferdinand, an able and enlightened ruler, who expelled the Jesuits 1768. He died 1802, and his dominions were immediately taken by the French, and were incorporated with France as the dept. of Taro 1805. In 1814, by the treaty of Paris, P., Piacenza, and Guastalla were presented as a sovereign duchy to the ex-empress Maria Louisa—a proceeding strongly opposed by the king of

Spain, who demanded them for his sister Maria Louisa, widow of Louis, King of Etruria, son of Duke Ferdinand. However, 1817, it was settled that Maria Louisa of Austria should possess the duchies, and that on her death they should descend to the rightful heir, Ferdinand Charles, Duke of Lucca, son of Maria Louisa of Spain; and on failure of his heirs, P. should revert to Austria, and Piacenza to Sardinia. On her death, 1847, the Duke of Lucca succeeded as Charles II., and certain exchanges of territory, previously settled by the great powers, took place with Tuscany and Modena—the chief being the transfer of Guastalla to Modena, resulting in a gain to P. of 100 sq. m. of territory. The duke's rule was tyrannical, and on an address being presented to him with a view of obtaining a reform of certain abuses, and a more liberal political constitution, similar to what Tuscany had obtained 1848, Feb., from its grand duke, he threw himself into the arms of Austria, and consented to the occupation of his territory by Austrian troops. 1848, Mar., a revolution broke out, and the duke was compelled to grant the popular demands; but he almost immediately retired from the country. P. joined with Sardinia in the war of 1848–9 against Austria, but on the triumph of Austria was compelled to receive Charles III. (his father, Charles II., having resigned his throne 1849, Mar.) as its ruler. The new duke recalled the constitution which his father had been compelled to grant, and punished with great severity the active agents of the revolutionary movements in his dominions. After Charles III.'s assassination 1854, Mar., his widow, Louise-Marie-Thérèse de Bourbon, daughter of the last Duke of Berry (q.v.), assumed the government for behoof of her son Robert I., and made some attempts at political reform; but the excited state of the people prevented their effectiveness, and she and her son were compelled to leave the country 1859, on the outbreak of a new war between Sardinia and Austria. 1860, Mar. 18, the country was annexed to Sardinia, and now forms a part of the 'compartimento' Emilia, in the kingdom of Italy, comprising the two provinces of Parma (1,270 sq. m.; pop. [1891] 271,621) and Piacenza (910 sq. m.; pop. 228,827); a few of the outlying districts being incorporated with other provinces; (1901) 294,159.

PAR'MA: chief town of the province of P., n. Italy; a fine city, formerly cap. of the duchy of P.; on both sides of the river P.; 12 m. s. from the Po, 75 m. s.e. from Milan, and about 75 m. e.n.e. from Genoa. An indecisive engagement took place here 1734, June 29, between the confederated armies of England, France, and Spain, and the Austrians; and 1799, June 19, the French under Macdonald were routed by the Russians under Suwaroff, with a loss of 10,000 men and 4 generals.

The town is of circular form, and surrounded by walls and ditches flanked by bastions; the streets are straight and wide, and meet at right angles, the chief of them, a part of the Roman Via Æmilia, crossing the city from

e. to w., and dividing it into two nearly equal parts. P. is notable for its churches, 10 in number, the principal being the *Duomo*, or Cathedral (consecrated 1106), built chiefly in the Lombard style, having the interior adorned with magnificent frescoes by Correggio and paintings by other artists, and surmounted by a beautiful dome; the *Battisterio*, or Baptistery, one of the most splendid in Italy, begun 1196, completed 1281; the church of the *Madonna della Steccata*, containing the famous painting of *Moses Breaking the Tables of the Law*, by Parmigiano. Other celebrated buildings are: the Farnese Palace, gloomy and ill-constructed; and the Farnese Theatre, built (1618–28) of wood, now dilapidated. P. has a library of 120,000 vols., mostly well selected, many rare and valuable; museum of antiquities; botanic garden; theatre (*Teatro Nuovo*); acad. of fine arts, founded 1752, possessing a collection of 600 pictures, many exceedingly valuable. The pictures most esteemed are the *Madonnas* of Correggio and Francia, the *St. Jerome* of Correggio, and the *Jesus Glorified* of Raphael.

The manufactures of P. are stockings, porcelain, sugar, wax candles, and vessels of crystal, also silk, cotton, and fustian stuffs. Chief exports are cheese ('Parmesan') and silk goods; and in June there is an annual silk-fair.—Pop. (1881) 45,217; (1901) 49,340.

PAR'MA, DUKE OF: see FARNESE, PIETRO LUIGI; and successors.

PARMACITY, n. *pâr-mă-sĭt'ĭ:* OE. for SPERMACETI, which see.

PARMELIA, *pâr-mē'lĭ-â:* genus of lichens, with leafy horizontal thallus, lobed and cut, and orbicular shields (*apothecia*) fixed by a central point, concave and bordered by the inflexed thallus. The species are numerous; some of them are occasionally employed in dyeing. Various chemical principles have been discovered in lichens of this genus, as *Usnine*, or *Usnic Acid* (found also in species of the genus *Usnea*), and *Parietin*. Valuable medicinal properties—tonic and febrifugal—have been ascribed to *P. parietina*, the Common Yellow Wall Lichen or Common Yellow Wall Moss of the herb-shops, a bright yellow species with deep orange shields, plentiful on walls and trees in most parts of Europe.

PARMENIDES, *pâr-mĕn'ĭ-dēz*, OF E'LEA: Greek philosopher in lower Italy, and in the opinion of the ancients the greatest member of the Eleatic school: b. prob. about B.C. 539 (though authorities differ); certainly a contemporary of Heraclitus. Nothing is known with certainty regarding his life, but he is said to have visited Athens in his old age, and to have conversed with Socrates, then quite a youth. The story, though it rests on the authority of Plato, has a suspicious air, and seems intended to account for the influence which the philosophy of P. undoubtedly exercised on that of Socrates and Plato themselves. P., like Xenophanes of Colophon, sometimes regarded as the first of the Eleatics, expounded his phi-

losophy in verse—his only work being a didactic poem, *On Nature*. The leading design of this poem is to demonstrate the reality of Absolute Being, the non-existence of which P. declares to be inconceivable, but the nature of which, on the other hand, he admits to be equally inconceivable, inasmuch as it is dissociated from every limitation under which man thinks. P. is not a theologist in speculation, seeking rather to identify his 'Absolute Being' with 'Thought' than with a 'Deity.' He presents a theory of the unity of nature, combined with a theory of its seeming plurality—i.e., of the variety and change of things. He founds his philosophy on the distinction between 'the Ent,' which is whole, indivisible, universal, continuous, unchangeable, perfect, the existent Unity; and 'the Non-ent,' to which pertain all plurality, variation, and change. The Ent, being the only reality, is the only object of knowledge; the Non-ent can be the object only of opinion. P.'s influence over subsequent thinkers is traceable, though various—owing, perhaps, to obscurity in his thought and expressions. Only fragments of his poem remain, separately edited by Fülleborn (Züllichau 1795); another collection is that by Brandis, in his *Commentationes Eleaticæ* (Altona 1815); but the best is in Karsten's *Philosophorum Græcorum veterum Reliquiæ* (Amstelod. 1835).

PARMESAN, a. *pâr'mĕ-zăn':* of or from *Parma*, in Italy; applied to a particular kind of cheese.

PARMIGIANO, *pâr-me-jâ'no*, Girolamo Francesco Maria Mazzola; called Francesco or Il Parmigiano or Parmigianino: 1504, Jan 11—1540, Aug. 24; b. Parma, Italy: famous painter of the Lombard school, and the most distinguished of those who, without servile imitation, followed the style of Correggio. His pictures attracted much attention when he was little more than 14 years of age. In 1523 he went to Rome to follow his studies, and was soon favorably noticed and employed by Clement VII. He was in that city when it was stormed by the imperialists under Bourbon 1527; and, it is said, was calmly at work on his great picture of *The Vision of St. Jerome* (now in the National Gallery, London) when soldiers, bent on pillage, burst into his studio: he was, however, protected by their leader. After this, he left Rome for Bologna, where he painted various important works, and returned to Parma 1531. Having engaged to execute several extensive frescoes in the church of S. Maria Steccata, after repeated delays he was thrown into prison for breach of contract, and at his release, instead of carrying out his undertaking, he fled to Casal-Maggiore, in the territory of Cremona, where he died soon afterward. Vasari, in his notice of P., attributes his later misfortunes and premature death to his passion for alchemy; but this oft-repeated story has been disproved by the researches of late biographers. He executed several etchings, and some wood-cuts are attributed to him. He had great personal beauty and a fascinating manner, and in his art a singular brilliancy.

PARNAHIBA, *pâr-nâ-ē′bâ*, or PARANAHYBA, *pâ-râ-nâ-ē′bâ:* river of Brazil, rising in the Sierra dos Coroados, between the provinces of Goyas and Piauhi, about 11° s. It flows n.e. and n., and enters the Atlantic in long. about 41° 40′ w. by five mouths, which inclose a delta about 30 m. wide along the coast. These mouths, however, are only two to four fathoms deep. It drains the province of Piauhi, and forms the boundary between it and the province of Maranham. Total length estimated 750 m.—Another river P. is a chief tributary of the Parana.

PARNASSIA, *pâr-năs′ĭ-â* [L. *Parnassia*, Parnassian]: genus of plants, ord. *Saxifragaceæ*. There are 14 species, all elegant plants—hence the name, as worthy to grow on Mt. Parnassus. They are annuals, with broad leaves mostly clustered at the base of the slender stem, which bears a single yellowish or white flower. The plants are commonly called 'grass of Parnassus.' *P. palustris* is found both in Europe and in N. America n. of the great lakes. *P. Caroliniana* grows in the n. and s. states.

PARNASSIAN, a. *pâr-năs′sĭ-ăn:* pert. to Parnassus, in Greece, the mountain sacred to Apollo and the Muses; of the genus *Parnassius;* of the sub-family *Parnassiinæ.*

PARNASSIINÆ, *pâr-năs-ĭ-ī′nē* [NL. *Parnassius* (q.v.) and *-inæ*]: sub-family of butterflies, the typical genus of which is *Parnassius.* The P. are confined to the n. hemisphere, and are found mostly on mountains—hence the name.

PARNASSIUS, *pâr-năs′ĭ-ŭs* [L.—from *Parnassus*]: genus of butterflies, usually white, sometimes tinted with yellow, and bearing crimson and black ocelli. Of the species (all distinguished by a name or epithet of Apollo), *P. apollo* inhabits Alpine regions of Europe; *P. phœbus* is peculiar to the Alps proper; *P. smintheus* is found in the Rocky Mountains.

PARNASSUS, *pâr-năs′ŭs*, modern LIAKHURA, *lē-â-ċhō′râ:* mountain in Phocis, greatly celebrated among the ancients, and regarded by the Greeks as the central point of their country. It has three steep peaks, almost always covered with snow, and seen from a great distance, the highest being fully 8,000 ft. above sea-level; but as only two of them are visible from Delphi, it was customary among the Greeks to speak of the two-peaked Parnassus. On its s. slope lay Delphi (q.v.), seat of the famous oracle, and the fountain of Castalia (q.v.). The highest peak was the scene of the orgies of the worship of Dionysus (Bacchus); all the rest of the mountain was sacred to Apollo and the Muses, whence poets were said to 'climb Parnassus,' a phrase still thus employed.

PARNELL, *pär'nĕl*, CHARLES STEWART, M.P.: Irish agitator: 1846, June 28—1891, Oct. 6; b Avondale, co. Wicklow, Ireland; grandson of Admiral Charles Stewart, U. S. N. He spent two years at the Univ of Cambridge, England; travelled in the United States; and then settled at his birthplace. He was appointed high sheriff of the county 1874, and elected member of parliament by the Home Rule party (see HOME RULE, in Ireland) 1875. In connection with Mr. Biggar, he inaugurated an obstructive policy in parliament, with a view to compelling action on important Irish questions. He introduced 1877, Feb., the Irish Church Act Amendment Bill, to enable the tenants of the disestablished Irish Church to purchase their holdings; but it was rejected by a vote of 150 to 110. He succeeded, after a long and bitter struggle, in securing better treatment of political prisoners, and abolition of flogging in the army. In 1878 P. succeeded Mr. Butt as pres. of the Home Rule Confederation; and on the formation 1879, Oct. 21, of the Irish National Land League, by Michael Davitt (see DAVITT, MICHAEL) and others, he was elected its president. The objects of the league were: to reduce the rack rents and to enable the occupiers to become possessors of the soil. The following Dec. he presented the cause of the league in several large American cities, and raised large sums of money with which to relieve the existing destitution caused by poor crops, and to carry on the work of the organization. The dissolution of parliament caused his return to Ireland as a candidate for re-election. He was chosen by Cork city, Mayo, and Meath, and chose to represent Cork. A land bill introduced by Gladstone (see GLADSTONE, WILLIAM EWART) was only partially satisfactory to the league. With others of the Irish agitators, P. was arrested and confined in Kilmainham jail. The league was declared an illegal organization, but offset this action by issuing a 'No Rent' proclamation. P. was released 1882, May. What had been won of public sympathy and political power thus far by the league was lost to the Irish cause by the assassination of govt. officers in Dublin. Various measures, including the Crimes Act, were adopted in parliament to check disturbance in Ireland and prevent obstruction of business in parliament. The Home Rule party demanded, but failed to secure, a separate parliament for Ireland. A land bill, designed to afford relief, was introduced 1887, and was promptly rejected. The *Times* published the fac-simile of a letter, said to have been written by P., in which regret was expressed for the murder of Lord Cavendish, but that of Mr. Burke was palliated. P. immediately declared the letter a forgery, and called for an investigation by the house, which was refused. A pamphlet entitled *Parnellism and Crime*, in which P. and his associates were accused of instigating numerous crimes and outrages, was issued by the *Times*. An unsuccessful suit for libel was brought by F. H. O'Donnell, but this was believed to be collusive

At the trial, incriminating letters from Parnell and others were presented, but were repudiated by them and their friends as forgeries. Parnell again demanded a parliamentary investigation; and, though the specific request was denied, a special commission of three judges was appointed to investigate all charges against Parnell and his party. The commission spent 128 days on the case, examined 500 witnesses, began its investigations 1888, Oct. 22, closed them 1889, Nov. 22, and made public its report 1890, Feb. 13. On all the direct charges, Parnell and his associates were exonerated; but they were found guilty of combining to 'boycott' the opponents of the league. The case against the *Times* was pressed, and the letters, which had been published as coming from Parnell, were proved to have been written by Richard Pigott, a notorious blackmailer, who admitted the crime, fled the country, and committed suicide in Spain 1889, Mar. 1, leaving in writing a full confession of his guilt. The *Times* published an acknowledgment that the letters were forged, apologized for printing them, and compromised the libel suit by a payment to Parnell of £5,000 damages. Parnell later was named as co-respondent in a suit for divorce brought by Capt. W. H. O'Shea against his wife. The jury found a verdict for the plaintiff, and the court granted the decree 1890, Nov. 17, neither the defendant nor co-respondent interposing a defense. After the divorce proceedings, Parnell was quietly married to Mrs. O'Shea. The disclosure created a general and painful surprise, and wide discussion as to the expediency of Parnell's continued leadership of the party. The Irish party at first reappointed him their chairman, but shortly afterward a letter from Gladstone to John Morley was published stating that if Parnell continued to be leader it would be 'disastrous in the highest degree to the cause of Ireland,' which, of course, implied that the support of Gladstone and his party would be withdrawn from Parnell. He was then deserted by the great majority of his parliamentary followers, and the Irish priesthood made a determined stand against him. He by no means tamely acquiesced in this position of affairs, but fought vigorously to the last to maintain his position as leader of the Irish people, thus overtasking his strength and breaking down his health. Parnell as a speaker was reserved and dignified; he had an unusual knowledge of parliamentary law, which he used most effectively, and for a time he completely dominated his party, making it a force both respected and feared in English political life. Consult: Hansard, *Parliamentary Debates* for 1875-91; Bryce, *Studies in Contemporary Biography* (1903); Mahoney, *Life of Parnell* (1886); Moore, *Parnell and His Island* (1887); O'Brien, *Life of Charles Stewart Parnell* (1888); O'Connor, *The Parnell Movement* (1890); Sherlocke, *Life of Parnell* (1887); *Memorial Volume to Charles Stewart Parnell*, with a biography by Walsh (1892).

PAR′NELL, THOMAS, D.D.: poet: 1679–1718, July; b. Dublin. He studied at Trinity College in Dublin, was ordained in the Established Church 1700, was made archdeacon of Clogher 1705, became prebendary of Dublin 1713 and vicar of Finglass 1716. He had inherited a fortune, but left the care of his estate and of his church to others, and spent a large part of his time in London. He became intimate with Swift, Pope, and other literary people; was a member of the Scriblerus Club, mingled in politics, and became famous as an occasional preacher, though giving most of his attention to literary and social pursuits. With the change of govt., he seems to have deserted the tories and joined the whigs, but retained the friends that he had previously made. The *Life of Homer* which appeared with the translation of the *Iliad* by Pope was written by P., and he made an effective rejoinder to various unfavorable criticisms of the manner in which the translation had been done. A vol. of his *Poems* was published by Pope 1722, and passed through several editions. Another vol., largely of religious poems, appeared 1758. Some doubt was thrown on the authenticity of the latter work, but able critics believe it was genuine. His *Life*, written by Goldsmith, was bound with some editions of the *Poems* above noted. He died at Chester.

PARNELLITE, n. *pâr′nėl-īt:* a supporter of the Irish policy of Charles Stewart Parnell.

PAROCHIAL, a. *pă-rō′kĭ-ăl* [mid. L. *parochĭālis*—from *parōchĭă*, the diocese of a bishop, a parish (see PARISH)]: of or pert. to a parish. PARO′CHIALLY, ad. *-lĭ.* PARO′CHIALIZE, v. *-īz*, to form into parishes. PARO′CHIALIZING, imp. PARO′CHIALIZED, pp. *-īzd.* PARO′CHIAL BOARD, in Scotland, board in each parish which manages the relief of the poor. PAROCHIAL RELIEF, relief of paupers by the parish authorities: see POOR, THE.

PARODY, n. *păr′ō-dĭ* [F. *parodie*—from Gr. *parōdĭă*, a parody—from *para*, beside; *ōdē*, a poem or song: It. *parodia*]: a poetical pleasantry in which verses of a grave and serious nature on one subject are altered and applied to another by way of burlesque: V. to alter, as verses or words, and apply them to a subject different from that of the original. PAR′ODYING, imp. PAR′ODIED, pp. *-dĭd.* PAR′ODIST, n. *-dĭst*, one who writes a parody. PARODIC, a. *pă-rŏd′ĭk*, or PAROD′ICAL, a. *-ĭ-kăl*, consisting of or resembling parody.—*Parody* is a burlesque imitation of a serious poem. Its peculiarity is that it preserves the form, and, as far as possible, the words, of the original, and thereby differs from a Travesty, which is a looser and less literal burlesque. The invention of the P. is ascribed usually to the Greeks (from whom we have derived the name), the first parodist, according to Aristotle, being Hegemon of Thasos, who lived during the Peloponnesian war; according to others, Hipponax. From fragments extant of ancient P., we infer that Homer was the favorite subject of comic

imitation. Thus Hipponax, in his picture of a glutton, ludicrously insinuates a comparison between the feats of his hero in eating and those of Achilles in fighting, by commencing as follows:

Sing, O celestial goddess. Eurymedon, foremost of gluttons,
Whose stomach devours like Charybdis, eater unmatched among mortals.

The *Batrachomyomachia* (Battle of the Frogs and Mice), erroneously ascribed to Homer, is also a happy and harmless specimen of the P., which, however, soon began to exchange its jocose and inoffensive raillery for a biting and sarcastic banter, of which numerous specimens are seen in the comedies of Aristophanes; while the philosopher Timon of Phlius invented, under the name *Silla*, a new species of satirical P. Among the Romans, this form of literature is met first in the period of the decline. All the power of Nero could not prevent his verses from being parodied by Persius. Among modern nations, the French, naturally, have been most addicted to this literary mimicry. Corneille parodied Chapelain in his *Cid*, and Racine parodied Corneille. The *potpourris* of Désaugiers are considered by his countrymen models of this ungracious kind of literature. Schiller's famous poem of the *Bell* has been often parodied by German wits. In England, perhaps the best compositions of this nature are the *Rejected Addresses* of the brothers James and Horace Smith: notable in particular is the P. on Scott's 'Battle of Flodden' in *Marmion*, ending—

'od rot 'em
Were the last words of Higginbotham.

Barham's *Ingoldsby Legends* contains a P. on Wolfe's *Lines on the Burial of Sir John Moore:* the first stanza is a specimen:

Not a sou had he got, not a guinea or note,
And he looked most confoundedly flurried
As he bolted away without paying his shot,
And his landlady after him hurried.

The *Verses* and *Translations* and the *Fly-Leaves* of C. S. Calverley contain clever parodies of the style of our modern poets. Thackeray's *Miscellanies* and Bret Harte's *Condensed Novels* also contain some very clever and satirical prose parodies on certain of their brother novelists.—See Moser in Daub's and Creuzer's *Studien;* also Moser's *Parodiarum Exempla.*

PAROLE (formerly PAROL), n. *păr-ōl'* [F. *parole*, word—from mid. L. *parab'ŏla*, a recital: F. *parler*, to speak]: words or oral declarations in law: ADJ. given by word of mouth; not written.—*Parole* is a declaration made on honor by an officer, in a case in which there is no more than his sense of honor to restrain him from breaking his word. Thus a prisoner of war may be released from actual prison on his parole that he will not go beyond certain designated limits; or he may even be allowed to return to his own country on his parole not to fight again, during the existing war, against

his captors. To break *parole* is accounted infamous in all civilized nations; and an officer who has so far forgotten his position as a gentleman ceases to have any claim to the treatment of an honorable man, nor can he expect quarter should he again fall into the hands of the enemy that he has deceived. P., in *milit.*, denotes also a daily password in camp or garrison. PAROLE EVIDENCE, direct evidence from the witness's own mouth, at a trial or hearing of a cause. PAROLE AGREEMENT, in *law*, any agreement made either by word of mouth or by writing not under seal. If the agreement is made by writing under seal, it is called a deed, or indenture, or covenant, according to the nature of its contents. (The older form, *Parol*, is still often used in the legal applications.)

PAROMOLOGY, n. *păr-o-mŏl′o-jĭ* [Gr. *paromologia*—from *paromologeō*, I grant—*para*, beside, beyond; *homologeo*, I grant]: in *rhet.*, a figure by which a speaker concedes something to his adversary in order to strengthen his own position.

PARONOMASIA, n. *păr′ō-nō-mā′zhĭ-ă* [Gr. *paronomăsiă*, a play upon words—from *para*, beside, alongside; *onŏma*, a name]: a play upon words, in which the same words in different senses, or words similar or like in sound, but different in signification, are put in opposition; a pun; the assonance of words in different parts of a sentence. PARONOMASTIC, a. *păr′ō-nō-măs′tĭk*, consisting in a play upon words.

PARONYCHIA, n. *păr′ō-nĭk′ĭ-ă* [Gr. *paronuchiă*, a whitlow—from *para*, beside; *onux*, the nail]: a whitlow or felon.

PARONYM, n. *păr′ō-nĭm* [Gr. *para*, beside; *onŏma*, a name]: a word resembling another in signification. PARONYMOUS, a. *pă-rŏn′ĭ-mŭs*, of like derivation; kindred; allied. PARON′OMY, n. *-ō-mĭ*, the quality of being paronymous.

PAROPAMISAN′ MOUNTAINS: see AFGHANISTAN.

PAROQUET, n. *păr′ō-kĕt* [see PARROT]: a small species of parrot—also written PAROKET, PARAQUET, and PARRAKEET, etc.: see PARRAKEET.

PAROS, *pā′rŏs:* one of the larger islands of the Grecian Archipelago, w. of Naxos, from which it is separated by a channel four to six m. wide; greatest length 15 m.; greatest breadth 9 m.; about 95 sq. m. Pop. 6,000. The surface is hilly, the scenery picturesque, and the soil naturally fertile, though imperfectly cultivated. The island is productive especially in cotton, wax, honey, partridges, and wild pigeons. Near the middle of the island, the mountain Capresso (anc. *Marpessa*) abounds in the famous Parian marble, used by many of the greatest sculptors of antiquity. Parekhia, on the w. coast, is the principal town, and Naussa, on the n. coast, the chief port.

In ancient times, P., said to have been colonized by

Cretans, attained great maritime prosperity, and became wealthy and powerful. It submitted to the Persians, and after the battle of Marathon was assailed ineffectually by Miltiades, who received here the wound of which he died. After the defeat of Xerxes, P. came under the supremacy of Athens, and shared the fate of the other Cyclades. Archilochus, inventor of iambic verse, was born here.

PAROTID, a. *pă-rŏt′ĭd* [F. *parotide*—from Gr. *parōtis* or *parōtĭda*, a tumor under the ears—from *para*, beside; *ous*, the ear]: pert. to certain glands. PAROTIS, n. *pă-rō′tĭs*, or PAROT′ID, plu. PAROTIDES, *pă-rŏt′ĭ-dēz*, the salivary glands situated below and before each ear, near the articulation of the lower jaw (see SALIVARY GLANDS). PAROTITIS, n. *păr′ō-tī′tĭs*, inflammation of the parotid glands; the mumps.

PAROUSIA, *pâ-row′zhĭ-â* [Gr. presence]: term in theol. denoting the presence of the coming One, i.e., of the Christ; thence his arrival, manifestation, advent. It is applied sometimes to advent or coming in general (II Cor. vii. 6, 7), and so to Christ's nativity; but specifically and usually denotes the visible, glorious, and consummating advent of the Lord Jesus Christ at the end of the world.

PAROXYSM, n. *păr′ŏks-ĭzm* [F. *paroxysme*, a fit of ague, a paroxysm—from Gr. *paroxus′mos*, excitement, exasperation—from *para*, beside; *ox′unein*, to sharpen—from *oxus*, sharp]: a fit of rage or passion; a recurring increase and exacerbation of a disease; in *geol.*, any sudden and violent effort of natural agency, such as the explosive eruptions of a volcano, or the convulsive throes of an earthquake. PAR′OXYS′MAL, a. *-ĭz′măl*, pert. to or occurring in paroxysms. PAR′OXYS′MIST, n. *-ĭz′mĭst*, in *geol.*, one who believes in the violent operations of nature, rather than in ordinary and continued ones.

PARQUETRY, n. *pâr′kĕt-rĭ* [F. *parquet*, an inlaid floor]: figured inlaid work of wood for flooring; a kind of wood mosaic. The art of making inlaid-wood floors, until lately little in use in this country, has been much in vogue on the continent of Europe, and has been carried to great perfection. P. floors are usually of oak, but other and more ornamental woods also are largely used for giving variety and beauty to the pattern. In the more elaborate kinds of P., veneers are used; but it is much more frequently composed of blocks of wood squared at the sides and laid down so as to combine and form a geometric pattern. This work is now extensively employed in the better class of buildings.

PARR, CATHARINE: see CATHARINE PARR.

PARR, or PAR, *pâr:* small fish, also called BRANDLING and FINGERLING in different parts of Britain, inhabiting rivers and streams, and formerly believed to be a distinct species of the genus *Salmo*, but now almost universally regarded as the young of the salmon (see SALMON). It is difficult to discriminate the young of different species of this genus. The parr rises with extraordinary readiness to the artificial fly; and until it began to receive protection as the fry of the salmon, vast numbers were killed by anglers.

PARR, SAMUEL, LL.D.: noted English scholar: 1747, Jan. 15—1825, Mar. 6; b. Harrow-on-the-Hill. He entered Emmanuel College, Cambridge, 1765; but the death of his father, two years afterward, necessitated his acceptance of an assistant-mastership at Harrow, where he remained five years. The head-mastership then becoming vacant, P. applied for it, but was rejected, whereupon he left, and started as an independent schoolmaster. In 1777 he was appointed master of Colchester School, where he was ordained priest, and obtained the curacies of Hythe and Trinity Church. Next year he became master of Norwich School; but 1786 settled at Hatton, in Warwickshire, where he spent the rest of his life. In 1787 he published an ed. of Bellenden, to which he prefixed his celebrated preface, as remarkable for its uncompromising advocacy of whig principles as for the scrupulous Ciceronianism of its Latinity. It is not easy to understand the reputation which P. formerly had: none of his voluminous writings justify it. That he was in some respects an accomplished, even a great, scholar, is undoubted, for he wrote Latin of Ciceronian purity and finish; but it is equally undoubted that he never did anything with his famous scholarship. P. has left the world absolutely nothing to keep it in remembrance of him, yet his complete works (ed. by Dr. J. Johnstone 1828)—exclusive of his contributions to periodicals—form eight enormous tomes, 5,734 octavo pages, many in small type. They relate to matters historical, critical, and metaphysical; but in all 'the thread of Parr's verbosity is finer than the staple of his argument.' What, then, gave him the fame that he certainly had during his life? Beyond question, it was his conversational powers. He was an amazing, an overwhelming, talker. Bold, dogmatic, arrogant, with a memory profoundly and minutely retentive, and with a genuine gift of ephemeral epigram, he seemed, at the tables of statesmen and wits and divines, to be a man of tremendous talent, capable of any literary feat; but the learning and the repartee have left little trace of their existence, and posterity declines to admire the wonders that it has neither seen nor heard. See De Quincey's famous essay on *Dr. Samuel Parr on Whiggism in its Relations to Literature* (author's ed., V., Edin., Adam and Charles Black 1862).

PAR'RA: see JACANA.

PARRAKEET, *păr'râ-kēt*, or PAROQUET, *păr'ō-ket* (also various forms—e.g., *Parakeeto*, *Paraquito*, *Paraquita*, *Paraquet*, *Perroquet*, etc.): name very commonly given to many of the smaller species of the parrot family; usually to species having long tails, natives of the E. Indies, Africa, and Australia; not so frequently to American species, though it is applied sometimes also to some of these, indifferently with the name Parrot (q.v.).—One of the most beautiful groups of the *Psittacidæ*, combining gracefulness of form with splendor of plumage, is that to which the ALEXANDRINA P. or RING P. (*Palæornis Alexandri*) belongs. It is about the size of a common pigeon, green, with a red collar, whence its name Ring P., and is a native of the E. Indies. It

Warbling Grass or Zebra Parrakeet (*Melopsittacus undulatus*).

is said to have been brought to Europe by some of the company in Alexander the Great's expedition to India, and to have been the first of the parrot tribe known to the Grecks and Romans, by whom it was highly prized, as it still is, not only for its beauty, but for its docility and its power of imitating human speech. Like many of its tribe, it is gregarious, and immense flocks make their abode in some of the cocoa-nut groves of w. Ceylon, filling the air with their deafening screams. The Ring P. has many congeners, natives chiefly of the E. Indies, exhibiting much variety of splendid plumage.—Somewhat like them in length and form of tail, but with longer and stronger legs, is the GROUND P. or GROUND

PARROT (*Pezophorus formosus*) of Australia, a bird once common in s. Australia and in Tasmania, but now nearly exterminated by cats run wild, which infest the scrubs. Its habits are very unlike those of parrots in general; it runs along the ground, and even seeks to escape from enemies by running, unwillingly takes wing, and then only for a short, low flight. It makes no nest, but lays its eggs in a hole in the ground. It is a small bird, not much more than 12 inches in entire length, one-half of which is occupied by the tail; its color, dark green above, yellowish below, less brilliant than in many of the parrot tribe, but finely marked and mottled. Its flesh has a very strong *game* flavor. There are numerous other Australian species, distributed in several genera, some of which, though less exclusively than that just noticed, live and seek their food on the ground. Some exhibit great splendor of plumage—e.g., ZEBRA P. (*Melopsittacus undulatus*), a very beautiful little species, which has often been brought to England, and has sometimes bred there. In the vast inland plains of Australia, this P. is seen in flocks of many hundreds, feeding on the seeds of the grasses, which afford food also to many other small species.

PARRAL, n. *păr'ral*, or PARREL, n. *păr'rĕl* [Port. *aparelho;* Sp. *aparejo*, tackle and rigging: F. *appareil*, gearing]: among *seamen*, the collars of greased ropes attached to the yards, and by which they slide up and down the mast.

PARRAMAT'TA: see PARAMATTA.

PARRAS, *pâr'râs:* well-built town of Mexico, state of Coahuila, 470 m. n.w. of Mexico, near the e. shore of Lake Parras. Pop. 8,000.

PARRHASIUS, *păr-rā'sĭ-ŭs* or *păr-rā'shĭ-ŭs:* one of the greatest painters of anc. Greece: b. Ephesus, B.C. 5th c. (date of death unknown); son of Evenor, himself an artist. P. had gained distinction as an artist previous to B.C. 399. He practiced his profession at Athens, whose inhabitants held him in high estimation and conferred on him the rights of citizenship. He was already celebrated in the time of Socrates, with whom, according to Xenophon (*Mem.* 3, 10), he held a conversation; and was also a younger contemporary of Zeuxis. Seneca, who lived several hundred years after P., tells a monstrous story about him. He says that when P. was painting his *Prometheus Vinctus*, he got possession of one of the prisoners taken at the capture of Olynthus by Philip of Macedon, B.C. 347, and crucified him in his studio, that he might copy from life the expression of agony. Fortunately for P.'s memory, the story is chronologically impossible, as it would require us to suppose that he was still alive and painting when more than 100 years old. P. appears to have surpassed all his predecessors in purity of design, accuracy of drawing, force of expression, and what is technically called 'finish.' According to Pliny, he was the first who established a

true proportion between the different parts of a picture, and delineated with elegance and precision all the minutæ of the features, even to those evanescent motions that betray the most delicate sentiments of the soul. He painted the extremities, such as the hands and fingers, in so exquisite a style that the intermediate parts seemed relatively—though *only* relatively—inferior. Quintilian calls him the legislator of his art, because his canon of proportion for gods and heroes was followed by all contemporary and subsequent painters. Among his works were an apparently symbolical picture of the Athenian *Demos* (*People*), a *Theseus, Naval Commander in Full Armor, Ulysses Feigning Madness, Castor and Pollux, Bacchus and Virtue,* a *Meleager, Hercules, and Perseus* on one canvas, a *Cretan Nurse with a Child in Her Arms,* a *Priest Officiating, with a Child Bearing Incense, Two Young Children,* an *Achilles,* an *Agamemnon,* etc. But his subjects were not always pure or lofty. His *Archigallus* (high-priest of Cybele) and his *Meleager and Atalanta* were most licentious representations.

PARRICIDE, n. *păr'rĭ-sīd* [F. *parricide*—from L. *parricīda,* murderer of a father—from *pater,* father; *cædo,* I kill: *patricida*]: murderer of a father or mother: the crime itself: also, a murderer of one to whom reverence is due; a destroyer or invader of his native country. Parricide is a popular rather than a legal term. In the Roman law it comprehended every one who murdered a near relative; but in English the term is usually confined to the murderer of one's father, or of one who is *in loco parentis.*

PARRISH, *păr'ĭsh,* Maxfield: American artist: b. Philadelphia, 1870, July 25. He studied at the Pennsylvania Academy of Fine Arts and was later a pupil of Howard Pyle. As an illustrator, he is well known for his posters and magazine covers. He designs in flat tints, strong and delicate outline, and elaborately detailed ground, or background, although he does not aim at perspective. He has illustrated *Mother Goose in Prose* and other humorous works with signal success. The *Bulletin Board* is among the best known of his paintings.

PARRISH, Stephen: American artist: b. Philadelphia, 1846, July 9. He first exhibited in the Pennsylvania Academy (1878), and in 1879 one of his pictures was hung in the New York National Academy. Since then he has produced a series of landscapes, usually large canvases, showing much power of expression and poetic feeling. Among these may be mentioned *The Road to Perry's Peak; Low Tide;* and *Evening.* He has been successful also as an etcher, especially in his treatment of American coast scenery, as in the series *Cape Ann to Marble Head.*

PARROT, n. *păr'rot* [contr. from F. *perroquet*, a parrot—from It. *perrochetto:* Sp. *Perico*, and its dim. *Periquito*, Peter, a parrot], (*Psittacus*): Linnæan genus of birds, now the family *Psittacidæ*, of order *Scansores*, or Climbers (q.v.); comprehending a vast number of species, natives of almost all tropical and subtropical regions; a few species extending further n. and s., in America, in New Zealand, and in Tasmania. They are birds mostly of splendid plumage. They vary very much in size, from the Great Macaw, more than three ft. in length, tail included, to the little Love-birds, not larger than sparrows. They mostly are gregarious, and are seen often in vast flocks, usually inhabiting forests, and making their nests in trees, feeding chiefly on fruits and seeds, partly also on leaves and buds; but some live in open plains, feeding on the seeds of grasses and other plants, bulbs, and succulent parts of vegetables. The *Kea* or Mountain Nestor, a New Zealand P., has of late taken to attacking sheep and devouring the flesh of living animals, to the great damage of the flocks. The voices of the P. tribe are generally harsh and discordant, though some of the smaller kinds have not unpleasant voices; but many of the larger have remarkable power of imitating human speech, and in domestication become capable of articulating not only words, but sentences. They show more intelligence than is usual in birds, with a monkey-like restlessness and love of trick; and though docile and affectionate, are generally of capricious, irritable temper. They have a short, stout, hard beak, rounded on all sides, and enveloped at the base in a membrane in which the nostrils are pierced; the upper mandible generally much longer than the lower, much curved, and sharp-pointed. The tongue is almost always very large, thick, round, and fleshy; the muscles which move the mandibles are more numerous and powerful than in most other birds. They make use of the powerful hooked bill as well as of the feet in climbing trees; and employ their feet as hands for holding their food and bringing it up to the mouth. Their feet differ from those of all the other climbers, in being covered with small tubercle-like scales, instead of plates. Some have short and some have long tails. Most of them have short wings. Their intestines are very long and slender, and without cæca.

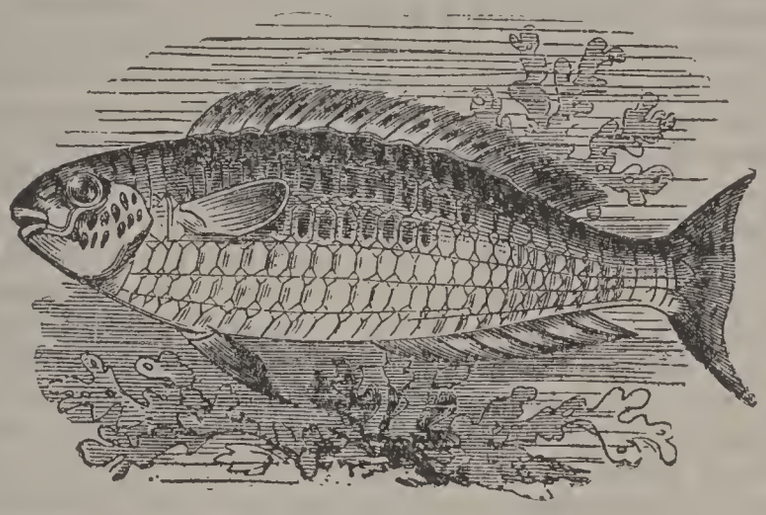
The *Psittacidæ* are easily distinguished from all other birds; but their division into distinct subordinate groups has been found not so easy. While the name P. popularly includes all, except that it is seldom given to some of the smallest species, some are known by the names Macaw, Cockatoo, Parrakeet, Lory, Love-bird, etc.: see these titles. But some of these names are very vaguely applied; and though the P. family is regarded as consisting of a number of very natural groups, the characters and limits of these groups have not yet been very well defined.

The name P., in its most restricted sense, is applied

sometimes to only those species which have the upper mandible very distinctly toothed, the lower mandible longer than it is high, and the tail short, and square or rounded; but this use is rather ornithological than popular; the most restricted popular use equally including long-tailed species, such as the Carolina P., ornithologically ranked with the macaws.—The CAROLINA P. (*Conurus Carolinensis*) is the species of which the n. range extends far beyond all others of its tribe, to the shores of Lake Michigan; though by the increase of cultivation, and the war waged against these birds for their depredations on orchards and corn-ricks, their numbers have been greatly diminished in regions where they were formerly plentiful. Its whole length is about 14 inches, of which about one-half is occupied by the tail; the general color is green, shaded with blue and diversified with orange, the wing primaries almost black. It is gregarious, prefers to roost in the holes of hollow trees, and in such situations also the females lay their eggs. It seems to love salt, frequenting salt *licks*, like pigeons. It is easily tamed, but does not acquire the power of articulation.—Of the short-tailed parrots, one of the best known is the GRAY P. (*Psittacus erythacus*), a w. African species, about the size of a small pigeon, of ash-gray color, with crimson tail. It is famous for its docility, its power of articulation and of imitating noises of all kinds, its loquacity, and its mischievousness. It is very often brought to northern and western countries, and often lives to a great age in confinement: individuals have been known to attain nearly 100 years.—The GREEN PARROTS (*Chrysotis*), natives of tropical S. America, also are among the short-tailed parrots most frequently seen in N. America and Britain.

PAR'ROT-COAL: cannel or gas coal that burns very clearly; named from its spirting or flying in pieces with a crackling or chattering noise when suddenly placed in the fire.

PAR'ROT-FISH (*Scarus*): genus of fishes of family *Labridæ* (q.v.) or *Cyclo-Labridæ;* of oblong, massive form, with large scales, and remarkable for the structure of their jaws and teeth, the jaws being divided into



Parrot-fish (*Scarus harid*).

halves by a median suture, the teeth incorporated with the bone in crowded quincuncial order, the surface even and polished in some species and rough in others, the oldest teeth forming the trenchant border of the jaw, and being succeeded by others as they are worn away, while new ones are formed behind. The species are numerous. Some feed on fuci, and some on corals, the younger branches of which they crush, so that the animal part affords them nourishment, while the calcareous part is rejected. They are fishes generally of brilliant colors, some of them of wonderful splendor; and have received the name parrot-fish partly on this account, partly on account of fancied resemblance in their jaws to a parrot's bill. Most of them are natives of tropical seas. One species is found in the Mediterranean (*S. Creticus*), the *Scarus* of the ancients, of which many wonderful stories were told, as to its love, its wisdom, its ruminating, its emitting of sounds, etc., and which was esteemed the most savory and delicate of all fishes. It is still held in high esteem for the table. The Greeks cook it with a sauce made of its own liver and intestines.

PARROTT, *păr′rot*, Enoch Greenleaf: naval officer: 1815, Nov. 27—1879, May 10; b. Portsmouth, N. H. At the age of 16 he became a midshipman in the navy, was promoted lieut. 1841, and was in service under Com. M. C. Perry on the w. African coast 1843. In the Mexican war he served at various points; he also rendered brilliant service in numerous engagements in the civil war. He was prominent in the capture of the privateer *Savannah*, the battle at Port Royal, on the James river, and the battles at Fort Fisher 1864, Dec., and 1865, Jan. At the latter point he commanded the *Monadnock*. For his bravery and skill he received high commendation from the navy dept. He received a commission as commander 1861, capt. 1866, commodore 1870, rear-admiral 1873, and was retired 1874. He died in New York.

PAR′ROTT, Robert Parker: 1804, Oct. 5—1877, Dec. 24; b. Lee, N. H. He graduated from West Point 1824; was connected with the artillery, but served as asst. prof. at the milit. acad. 5 years; was in garrison service 1831–34, when he was placed on ordnance duty; became capt. of ordnance 1836, with headquarters at Washington, but resigned Oct. of the same year, to become supt. of the West Point iron and cannon foundry at Cold Spring, N. Y. At the latter place he invented and brought to a high degree of perfection the forms of rifled cannon and projectiles which have received his name, and of which large numbers were used by the govt. in the civil war. He was judge of the common pleas county court 1844–47. He resigned the superintendency of the foundry 1867, after which time he was connected with various private manufacturing enterprises. He died at Cold Spring, N. Y.

PARRY, v. *păr′rĭ* [It. *parare;* F. *parer*, to keep off, to ward off: L. *parārĕ*, to get ready: It. *parata*, a defense, guard]: to ward off, as a blow or thrust; to fence. Par′rying, imp. Par′ried, pp. *-rĭd*.

PARRY, *păr′rĭ*, Sir William Edward, commonly known as Sir Edward Parry: celebrated English navigator: 1790, Dec. 19—1855, July 7; b. Bath. His father, who was a physician of some eminence, intended him for the medical profession; but, acting on the advice of a friend, entered him as a first-class volunteer on the *Ville-de-Paris*, flag-ship of the Channel fleet, 1803. After several years' service, he received his commission as lieut. 1810, Jan. 6. Though thus early engaged in active service, his education had not been neglected; at school he had attained considerable eminence in classical knowledge, and for the first five years after entering the navy he had particularly studied French and mathematics under the chaplain's superintendence, after which he constantly employed his leisure time in nautical and astronomical studies. 1810, Feb., he was sent to the Arctic regions in command of a ship, to protect the British whale fisheries and improve the admiralty charts of those regions; but 1813 he was recalled and dispatched to join the fleet then blockading the coast of

the United States. He remained on the N. American station till the spring of 1817, and during this time he wrote and distributed MS. copies of a work entitled *Nautical Astronomy by Night*, in which rules were given for determining accurately the altitude of the pole by observations of the fixed stars. This work he subsequently published in London. Having returned to England too late to take part in the African exploring expedition, he was, at his urgent request, backed by the recommendations of the sec. to the admiralty, appointed to command the *Alexander*, under the orders of Capt. John Ross in the *Isabella*, and dispatched in search of the 'Northwest Passage' (q.v.) 1818, April. The expedition returned to England, having made no important discoveries. The admiralty were dissatisfied with the report of Capt. Ross; and P.'s opinion, though communicated only to his private friends, having become known, he was sent out (1819, May), and began that career of discovery (see NORTHEAST AND NORTHWEST PASSAGES) which has given him rank among the greatest Arctic explorers. P. on his return to Britain was hailed with the utmost enthusiasm, and was made commander (1820, Nov. 4), and a member of the Royal Soc. He subsequently made a second and a third voyage to the same regions, but effected nothing further of importance. P. then applied himself to his duties as hydrographer; but such labors were too monotonous for one of his temperament, and he accordingly prepared a plan of an expedition for reaching the n. pole; which being submitted to the admiralty and approved of by them, his old ship the *Hecla* was fitted out for a polar expedition, and P. set sail in her, accompanied by Lieut. J. C. Ross, 1827, Apr. 4: see POLAR EXPEDITIONS.

P.'s career as an explorer was now closed, and he again returned to his duties as hydrographer; but his health gave way under this sedentary mode of life, and he exchanged his office for that of commissioner to the Agricultural Company of Australia, for which country he sailed 1829, July 20. He returned to England 1834, Nov., and filled, in succession, various govt. appointments till 1846, Dec., when he retired from active service, receiving a sinecure office. 1852, June 4, he was raised to the rank of Rear-Admiral of the White, and in the following year was appointed lieut.gov. of Greenwich Hospital—an office which he held till his death at Ems, in Germany, whither he had gone for benefit of his health. A complete ed. of his voyages was published 1833 (Lond. 5 vols.). His life has been written by his son, the Rev. Edward Parry, M.A., of Balliol College, Oxford (1857).

PARSE, v. *pârs* [L. *pars*, a part, as in *pars oratĭōnis*, a part of speech]: to resolve a sentence into its elements; to name the parts of speech in a sentence, and to tell their relation to each other. PARS'ING, imp.: N. the art or act of resolving a sentence into its elements. PARSED, pp. *pârst*. PARS'ER, n. *-ẽr*, one who can parse, or who parses.

PARSEE, n. *pâr'sē*, PARSEES, n. plu. *pâr'sēz* [Pers. *Parsi*, a Persian, a fire-worshipper—from *Pars*, or *Fars*, anc. Persia]: one of the Persian refugees driven out of their own country by the Mohammedans, now living in various parts of India. PAR'SEEISM, n. *-izm*, fire-worship, the religion of the Parsees, spelled also PARSI, n. *pâr'sē*, PARSIS, n. plu. *pâr'sēz*.—The *Parsees* are the small remnant of the followers of the ancient Persian religion, as reformed by Zerdusht, or Zoroaster, as he is commonly called. They are known also as *Guebres* (see that title for their recent history and present numbers). The pre-Zoroastrian phase or phases of their primeval religion will probably forever remain shrouded in obscurity; however, it is established by recent investigations, that this, and what afterward became the Brahmanic religion, were originally identical; that in consequence of certain social and political conflicts between the Iranians and the Aryans, who afterward peopled Hindustan proper, an undying feud arose, in the course of which the former forswore even the hitherto common faith, and established a counter faith (Ahura), a principal dogma of which was the transformation of the ancient, now hostile, gods into demons, and the branding of the entire Deva religion as the source of all mischief and wickedness. Zerdusht, the prophet, whose era is given very differently by ancient writers and by modern investigators — placed variously between B.C. 500 or 600 (Röth) and B.C. 1200 (Haug) — had, like all prophets and reformers, many predecessors, chiefly among the Soshyantos or fire-priests (Atharvans); yet to him belongs the decisive act of separating forever the contending parties, and of establishing a new community with a new faith—the Mazdayasna or Parsee religion proper, which absorbed the old Ahura religion of the fire-priests. For summary of what is known and speculated about the person of the great reformer, see ZOROASTER. As to his doctrines, the principle of his theology was pure Monotheism: he taught the existence of one only deity, the Ahura, who is called Mazdaô (see ORMUZD), creator of all things, to whom all good things, spiritual and temporal, belong. The principle of his speculative philosophy is dualism, i.e., the supposition of two primeval causes of the actual and intellectual world; the Vohu Manô, the Good Mind or Reality (Gaya), and the Akem Manô, or the Naught Mind, or Non-reality (Ajyâiti); while the principle of his moral philosophy is the triad of Thought, Word, and Deed. Not long, however, did the pure idea of Monotheism prevail. The two sides of Ahura Mazdaô's being were taken to be two distinct personages — God and Devil — and they each took their due places in the Parsee pantheon in the course of time — chiefly through the influence of the sect of the Zendiks, or followers of the Zend, i.e., Interpretation. According to Zerdusht, there are two intellects, as there are two lives—one *mental* and one *bodily;* and, again, there must be distinguished an *earthly* and a *future* life. The im-

mortality of souls was taught long before the Semites had adopted this belief. There are two abodes for the departed—Heaven (Garô-Demâna, the House of the Angels' Hymns, Yazna, xxviii. 10; xxxiv. 2; cf. Is. vi., Revelat., etc.) and Hell (Drâjô-Demâna, the residence of devils and the priests of the Deva religion). Between the two there is the Bridge of the Gatherer or Judge, which the souls of the pious alone can pass. There will be a general resurrection, which is to precede the last judgment, to foretell which Sosiosh (Soskyans), the son of Zerdusht, spiritually begotten (divided by later priests into three persons), will be sent by Ahuramazdao. The world, which by that time will be utterly steeped in wretchedness, darkness, and sin, will then be renewed; death, the arch-fiend of creation, will be slain, and life will be everlasting and holy. These are the outlines of the Zoroastrian creed, as it flourished till the time of Alexander the Great, throughout ancient Irania, including Upper Tibet, Cabulistan, Sogdiana, Bactriana, Media, Persis, etc.; and it is interesting to speculate on the consequences which might have followed Marathon and Salamis had the Persians been victorious. The religion of Ormuzd would have dethroned the Olympians, as it dethroned the gods of the Assyrians and Babylonians; and it would certainly have left its traces on the whole civilized world unto this day in a much more direct and palpable shape than it now does. From the death of Alexander, however, it gradually lost ground, and rapidly declined under his successors, until, in the time of Alexander Severus, Ardshir 'Arianos' (cf. Mirkhond ap. de Sacy, *Mémoires sur div. Aut. de la Perse*, etc., p. 59), son of Babegan, called by the Greeks and Romans Artaxerxes or Artaxares, who claimed descent from the ancient royal lineage of Persia, took the field against Artabanus, and slew him (225), thus putting an end to the 400 years' rule of the Parthians, and founded the Sassanide dynasty. This he effected in conjunction with the national Persians, who hated the 'semi-Greek' dynasty of the Arracidæ, their leaning to the foreign, and contempt for the Zend religion, and finally for their powerlessness against the spreading conquests of the Romans. The first act of the new king was the general and complete restoration of the partly lost, partly forgotten books of Zerdusht, which he effected, it is related, chiefly through the inspiration of a Magian sage, chosen out of 40,000 Magians. The sacred volumes were translated out of the original Zend into the vernacular, and distributed among the people at large, and fire temples were reared throughout the length and breadth of the land. The Magi or priests were all-powerful, and their hatred was directed principally against the Greeks. 'Far too long,' wrote Ardshir, the king, to all the provinces of the Persian empire, 'for more than 500 years, has the poison of Aristotle spread.' The fanaticism of the priests found vent often also against Christians and Jews The Jews have left some account of the tyranny

and oppression to which they as unbelievers were exposed—such as the prohibition of fire and light in their houses on Persian fast-days, of the slaughter of animals, the baths of purification, and the burial of the dead according to the Jewish rites—prohibitions to be bought off only by heavy bribes. In return, the Magi were cordially hated by the Jews, and remain branded in their writings by the title of demons of hell (*Kidushin*, 72 a.). To accept the instruction of a Magian is pronounced by a Jewish sage to be an offense worthy of death (*Shabb.* 75 a.; 156 b.). This mutual animosity does not, however, appear to have long continued, since in subsequent times we frequently find Jewish sages (Samuel *the Arian*, etc.) on terms of friendship and confidence with the later Sassanide kings (cf. Moed Katan, 26 a. etc.). From the period of its re-establishment, the Zoroastrian religion flourished uninterruptedly about 400 years, till, A.D. 651, at the great battle of Nahavand (near Ecbatana), the Persian army, under Yezdezird, was routed by the Caliph Omar. For the subsequent fate of those that remained faithful to the creed of their fathers, see GUEBRES. At present, some remnants inhabit Yezd and Kirmân, on the ancient soil of their race; others, who preferred emigration to the endless tribulations inflicted on them by the conquering race, found a resting-place along the w. coast of India, chiefly at Bombay, Surat, Nawsari, Achmedâbâd, and the vicinity, where they now live under English rule, and are recognized as one of the most respectable and thriving sections of the community, being mostly merchants and landed proprietors. Equally with their poorer brethren in Persia, with whom they have of late renewed some slight intercourse for religious and other purposes—such as their Rivâyets or correspondences on important and obscure doctrinal points—they bear the highest character for honesty, industry, and peacefulness; while their benevolence, intelligence, and magnificence in living outvies that of most of their European fellow-subjects. Their general appearance is to a certain degree prepossessing, and many of their women are strikingly beautiful. In all civil matters they are subject to the laws of the country that they inhabit; and its language is theirs also, except in the ritual of their religion, when the holy language of Zend is used by the priests, who, as a rule, have no more knowledge of its meaning than the laity.

We have spoken of the leading fundamental doctrines as laid down by their prophet. Of their very copious rituals, which have partly found their way into other creeds, the following are a few points. They do not eat anything cooked by a person of another religion; they also object to beef, pork, especially to ham. Marriages can be contracted only with persons of their own caste and creed. Polygamy, except after nine years of sterility and divorce, is forbidden. Fornication and adultery are punishable with death. The bodies of their dead are not buried, but exposed on a Dakhma, or Tower of Si-

lence, that they may be dissipated without polluting the earth.

Ahuramazdao being the origin of light, his symbol is the sun, with the moon and the planets; and in default of these, the fire; and the believer is enjoined to face a luminous object during his prayers. Hence, also, the temples and altars must forever be fed with the holy fire, brought down, according to tradition, from heaven, the sullying of whose flame is punishable with death. The priests themselves approach it only with a half-mask (Penom) over the face, lest their breath should defile it, and never touch it with their hands, but with holy instruments. The fires are of five kinds; but however great the awe felt by Parsees with respect to fire and light (they are the only eastern nation who abstain from smoking—because of their reverence for fire), yet they never consider these as anything more than emblems of Divinity. There are also five kinds of 'Sacrifice,' which term, however, is to be understood rather in the sense of a sacred action. These are—the slaughtering of animals for public or private solemnities; prayer; the Daruns sacrament, which, with its consecrated bread and wine in honor of the primeval founder of the law, Hom or Heomoh (Skr. *Soma*), and Dahman, the personified blessing, bears a striking outward resemblance to the Christian ordinance of the Lord's Supper; the sacrifice of Expiation, consisting either in flagellation, or in gifts to the priest; and, lastly, the sacrifice for the souls of the dead. The purification of physical and moral impurities is effected, in the first place, by cleansing with holy water (Nirang), earth, etc.; next, by prayers (of which 16, at least, are to be recited every day) and the recitation of the divine word; but other self-castigations, fasting, celibacy, etc., are considered hateful to the Divinity. The ethical code may be summed up in the three words—purity of thought, of word, and of deed: a religion 'that is for all, and not for any particular nation,' as the Zoroastrians say. It need hardly be added, that superstitions of all kinds have, in the course of the tribulations of ages, and the intimacy with neighboring countries, greatly defiled the original purity of this creed, and that its forms now vary much among the different communities of the present time.

A schism which seems very serious has lately broken out in the Parsee communities, and the modern terms of Conservative and Liberal, or rather bigot and infidel, are almost as freely used with them as in Europe. The sum and substance of these innovations, stoutly advocated by one side, and as stoutly resisted by the other, is the desire to abolish the purification by the Nirang (cow-urine), to reduce the large number of obligatory prayers, to stop early betrothal and marriage, to suppress the extravagance in funerals and weddings, to educate women, and to admit them into society. Two counter alliances or societies, the 'Guides of the Worshippers

of God' and 'the True Guides' respectively, are now trying to carry out, by meetings, speeches, tracts, etc., the objects of their opposing parties. The present number of the P. is stated to be in all not much more than 80,000. There are but two castes among them—the priests and the people: the priesthood is hereditary. In business, the P. have great sagacity and enterprise; their commercial credit stands at the highest; and they have many large business houses in principal ports of Asia, besides some in Africa and Europe.

For the literature of the Parsees, see PERSIAN LANGUAGE AND LITERATURE: ZEND-AVESTA. Besides the latter, written in ancient Zend, and its Gujarati translation and commentaries, there are to be mentioned, as works treating specially of religious matters, the *Zardusht-Nameh*, or Legendary History of Zerdusht; the *Sadder*, or Summary of Parsee Doctrines; the *Dabistan*, or School of Manners; the *Desatir*, or Sacred Writings, etc. All these have been translated into English and other European languages.

On the influence Parsism has had upon Judaism and its later doctrines and ceremonial, and, through it, upon Christianity and Mohammedanism—which besides drew from Parsism directly—it may be stated that even a cursory reading of the sacred Parsee books will show, in a variety of points, their direct influence on the three Semitic creeds. Of works on the Parsees, consult, principally, Hyde, *Vet. Rel. Pers. Hist.* (Oxon. 1760, 4to); Ousely, *Travels in the East* (Lond. 1819); Anquetil du Perron, *Exposition des Usages des Parses;* Dosabhoy Framjee, *The Parsees*, etc. (1858); Dosabhai Framji Karaka, C. S. I., *The History of the Parsis* (2 vols. 1884); Dadabhai Naoroji, *The Manners and Customs of the Parsees;* and *The Parsee Religion* (Liverpool 1861, 8vo.; Haug's *Essays on the Parsee Religion* (Bombay 1862), and Spiegel's *Erân* (Berl. 1863).

PARSIMONY, n. *pâr'sĭ-mŏn-ĭ* [F. *parsimonie*—from L. *parsimōniă*, frugality—from *parcus*, sparing: It. *parsimonia*]: sparingness in the use and expenditure of money; frugality; excessive caution in the expenditure of money; closeness. PAR'SIMO'NIOUS, a. *-mō'nĭ-ŭs*, sparing in the use of money; covetous. PAR'SIMO'NIOUSLY, ad. *-lĭ*. PAR'SIMO'NIOUSNESS, n. *-nĕs*, a very sparing use of money; a disposition to save expense. LAW OF PARSIMONY, in *metaph.*, rule that no fact be assumed as a fact of consciousness but what is ultimate and simple.—SYN. of 'parsimonious': sparing; saving; frugal; economical; thrifty; penurious; niggardly; avaricious; miserly; close; illiberal: see also PARCIMONY.

PARSLEY, n. *pârs'lĭ* [F. *persil*—from L. *petroselīnum*, rock-parsley—from Gr. *petros*, a rock; *selīnon*, a kind of parsley], (*Petroselinum*): genus of plants of nat. order *Umbelliferæ*. The species are annual or biennial, branching, smooth, herbaceous plants, with variously pinnated leaves.—Common P. (*P. sativum*), which has tripinnate shining leaves, is a native of s. Europe, growing chiefly on rocks and old walls, and naturalized in parts of England and in the United States. The cultivation is extremely simple, and an annual sowing is generally made, though when cut over and prevented from flowering, the plant lives several years. A variety with curled leaflets is generally preferred to the common kind with plain leaflets, as finer and more beautiful, being often used as a garnish; it is also safer, as the poisonous Fool's P. (q.v.) is sometimes gathered by mistake instead of the other.—Hamburg P. is a variety with a large white carrot-like root, cultivated for its root, and much in the same way as the carrot or parsnip. To produce large roots and of delicate flavor, a very rich soil is required. The foliage of P. is of use not only for garnish and flavor, but also as nutritious and stimulating—deriving its stimulant quality from an essential oil present in every part of the plant. P. contains also a peculiar gelatinous substance called *Apiine*. The bruised leaves of P. are applied sometimes as a stimulating poultice. The seeds are a deadly poison to many birds: when powdered, they are sometimes used for killing lice.

PARSNIP, n. *pârs'nĭp* (formerly *Parsnep*) [corruption of L. and It. *pastināca*, a parsnip—from L. *pastĭnārĕ*, to dig and trench: OF. *pastenaque:* Dut. *pastinak*, a parsnip: the *nep* of the Eng. name is probably the *nip* of *turnip*, signifying a tap-root], (*Pastinaca*): genus of plants of nat. order *Umbelliferæ*, having compound umbels with neither general nor partial involucres; yellow flowers with roundish, involute, sharp-pointed petals; calyx almost without teeth; fruit dorsally compressed and flat, with a broad border, the ridges very fine. The species are annual, biennial, or perennial herbaceous plants, with carrot-like, often fleshy roots, and pinnate leaves. —The Common P. (*P. sativa*) is a biennial, with angular furrowed stem, 2–3 ft. high, pinnate leaves with ovate leaflets, rather shining, cut and serrated, and a three-lobed terminal leaflet.—Another species, the Cut-leaved P. or Sekakul (*P. Sekakul*), having pinnatifid cut leaflets, native of India, Syria, and Egypt, is cultivated in the Levant, and is very similar in its uses to the common parsnip.

The P. grows wild in large portions of Europe and Asia, was cultivated by the Romans, and was brought to this country by the early explorers. If neglected, the P. soon reverts to its original type, becomes unfit for food, and even assumes poisonous properties. The wild P. of the United States is the ordinary P. escaped from control. Under cultivation the P. is one of the most nutritious roots. It is excellent for the table, and second

only to the sugar beet (see SUGAR BEET) for live-stock. It is specially valuable for cows giving milk. The percentages of the digestible constituents of the roots are given as follows: albuminoids, 1·6; carbo-hydrates, 11·2; fats, 0·2. In England and Ireland, a kind of wine is made from the roots and in the latter country a fermented liquor is made with the addition of hops and yeast.

The P. thrives best on a deep, rich soil, whether in loams or clays. The ground should be deeply plowed and a liberal dressing of wood ashes or commercial fertilizer harrowed in. For garden crops rows may be only 12 to 15 in. apart but in field culture the distance should be doubled. Sowing must be done very early in the spring. Seed should be used at the rate of 5 to 8 lbs. per acre, according to the distance apart of the rows. As soon as the rows can be seen, cultivation should commence, and weeds must be kept down during the entire season. When the plants are well started they are to be thinned to stand 4 to 6 in. apart. As their most rapid growth is made very late in the fall, the roots should remain as long as they can without being frozen into the ground. Harvesting can be facilitated by the use of a large plow; the tops having been cut with a sharp hoe and raked off from the land. Where large crops of roots of any kind are grown, a double plow, made specially for lifting such crops, is of great value. The roots should be stored in a cool cellar or a dry pit where they can be kept from the light and from currents of air. Part of the crop is usually left in the ground over winter, as the quality of the roots is thus improved, but harvesting must be done before growth begins in the spring. The seed usually retains its vitality only one year; but if well kept, a small proportion will germinate the second season. It should be grown from the best roots and only the finest heads should be saved. The roots grow 15 to 20 inches in length, but those of a kind in the island of Guernsey are said to be 3 to 4 ft. long. About 15 varieties are grown in the United States. Of these, the Student, developed from the wild form by Prof. Buckman of England, is one of the best for table use.

PARSON, n. *pâr′sn* [L. *persōna*, the person, in mid. L. dignity or office: mid. L. *persōna ecclēsiæ*, the person who represents the church in a parish]: rector of a parish; the ecclesiastical incumbent; a clergyman; a man in orders. PARSONAGE, n. *pâr′sn-āj*, house set apart for the residence of the incumbent of a parish: in the United States, house and appurtenances, provided by a church for its pastor's residence.—*Parson*, in English ecclesiastical law, is the incumbent of a benefice in a parish. He is called parson (Lat. *persona*) as being distinctively the *person* who represents the church for several purposes. He is required to be a member of the Established Church of England, and to be duly admitted to holy orders, presented, instituted, and inducted; and

to be 23 years of age. His induction puts him in full possession of the incumbency. The theory is, that the freehold of the parish church is vested in him, and as the legal owner, he has various rights of control over the chancel. He is also the owner of the churchyard, and as such is entitled to the grass. As owner of the body of the church, he has a right to control of the church bells, and is entitled to prevent the churchwardens from ringing them against his will. The distinction between a parson and vicar is that the parson has generally the whole right to the ecclesiastical dues in the parish, whereas the vicar has an appropriator over him, who is the real owner of the dues and tithes, and the vicar has only an inferior portion. The duty of the parson is to perform divine service in the parish church under the control of the bishop, to administer the sacraments to parishioners, to read the burial-service on request of the parishioners, to marry them in the parish church when they tender themselves. He is bound to reside in the parish, and is subject to penalties and forfeiture if he without cause absent himself from the parish. He is subject to the Clergy Discipline Act, in case of misconduct.

PARSONS *pâr'sonz:* Kan., city in Labette County, on the Saint Louis & S. F. and the Missouri, K. & T. railways; about 125 m. in direct line south by east of Topeka. It was settled in the early 'settlement days' of Kansas, but was laid out and incorporated in 1871, and in 1873 was made a city of the second class. It is in a productive agricultural region, and the commercial centre of quite an extent of territory. The chief industrial establishments are grain elevators, creameries, flour and feed mills, foundry, agricultural implements works, and railroad shops. The Missouri, Kansas & Texas railroad has its general offices in this city. There are two parks, well kept streets, and good roads leading into Parsons. The prominent buildings are the State Hospital for the Insane, the Masonic Temple, the Y. M. C. A. building, the churches and schools, and the Missouri Kansas & Texas station and office building. The educational institutions are the high school, public and parish elementary schools, and a public library. Natural gas is in general use for lighting and for fuel. Pop. (1900) 7,682; (1904), 10,789.

PARSONS, *pâr'sonz,* Albert Ross: American musician and archæologist: b. Sandusky, Ohio, 1847, Sept. 16. He was educated in Buffalo, N. Y., and Germany; he is especially prominent as a specialist in musical pedagogy and technics, and has also devoted much study to archæology. As a pianist and composer of pianoforte music he gained considerable attention and he has also acted as a critic of music. He translated Wagner's *Beethoven,* Lessman's *Liszt,* etc., designed the

symbolic pyramid mausoleum at Greenwood cemetery, and has written: *Science of Pianoforte Practice; The Secret of Wagner's Genius; New Light from the Great Pyramid* (1893); etc.

PARSONS, Alfred William: English painter: b. Beckington, Somersetshire, 1847, Dec. 2. He has made his specialty water-color landscapes of English scenery, executed with great dash yet lightness of touch, accuracy of drawing and dazzling color. His pictures have been awarded medals at Paris (1889), Chicago (1893), and Munich (1893). He also designs in black and white, and in collaboration with E. A. Abbey (q.v.) has furnished illustrations for *Old Songs; A Quiet Life; The Danube from the Black Sea to the Black Forest.* Among the most characteristic of his paintings are *When Nature Painted All Things Gay* (1887), bought by the Chantrey bequest; and *A Mid-May Morning.*

PARSONS, Charles: American artist: b. Hampshire, England, 1821, May 8. He was educated in New York, studied art at the National Academy; was elected an A. N. A. in 1860, worked as a lithographer 1838–61, and became director of the art department of Harper & Bros., for whose publications he furnished many illustrations, and from whose employ he retired in 1889. He won some repute as a landscape painter and exhibited at the National Academy and the exhibitions of the Water Color Society. His best known paintings are: *Salem* (1876); *November* (1877); *Gravesend Bay* (1878); and *Old Orchard* (1884).

PARSONS, Frances Theodora Smith Dana: American nature writer: b. New York, 1861, Dec. 5. She was married to William Starr Dana (d. 1890) in 1884, published *How to Know the Wild Flowers* (1893); *According to Season* (1894); and *Plants and Their Children* (1895). In 1896 she was married to J. R. Parsons of Albany, N. Y., and under her present name has published *How to Know the Ferns* (1899); etc.

PARSONS, Frank: American lawyer and political economist: b. Mount Holly, N. J., 1854, Nov. 14; d. Boston, Mass., 1908, Sept. 26. He was graduated from Cornell in 1873; he studied law, was admitted to the bar in Boston, and opened an office there. He rewrote several law treatises, including Morse *On Banks and Banking,* Perry *On Trusts,* and May *On Insurance,* and in 1892 was appointed lecturer on law at Boston University. He also became known through his books and lectures as a student of political economy, and from 1897 to 1900 was professor of history and political science at the Kansas Agricultural College, and in 1900 became professor of political science at Ruskin College, Trenton, Mo. He was dean of the university extension department there, and lectured for the University Extension Association of Chicago. In 1901–2 he was an

expert witness before the United States Industrial Commission on the public ownership of railroads, telephones, and telegraphs. His publications include: *The World's Best Books* (1892); *Our Country's Need* (1894); *The Drift of Our Time* (1898); *Rational Money* (1899); *The New Political Economy* (1899); *The Power of the Ideal* (1899); *The City for the People* (1900); *Direct Legislation* (1900); *The Story of New Zealand* (1904); *The Railways, the Trusts, and the People* (1906); *The Heart of the Railway Problem* (1906). He was among the leaders of the progressive economists and an earnest advocate of the public ownership of monopolies.

PARSONS, Lewis Baldwin: American soldier and lawyer: b. Genesee County, N. Y., 1818, April 5; d. Flora, Ill., 1907, March 16. He was graduated from Yale in 1840, from the Harvard Law School in 1844, and established a law practice in Alton, Ill., where he was city attorney in 1846–9. At the outbreak of the Civil War he entered the Union army as captain of volunteers, served through the war, with promotion, was chief of river and railroad transporation of the national armies and was retired in 1866 with the rank of brevet brigadier-general of volunteers. He afterward devoted himself to law practice, and in 1895–8 was president of the Illinois Soldiers' and Sailors' Home.

PARSONS, or Persons, Robert: English Jesuit and controversialist: b. Nether Stowey, Somerset, 1546, June 24; d. Rome, 1610, April 15. He was educated at Oxford, was elected fellow of Balliol in 1568, and in 1574 became its dean. In 1574 Parsons went to the continent, and on his way to Italy stopped at Louvain, where he was probably received into the Roman Catholic Church, and at Rome entered upon his novitiate in the Society of Jesus (1575). In 1578 he was ordained priest and made English penitentiary at the Vatican. With Edmund Campion and several secular priests he arrived in England in 1573 under instructions from Aquaviva, general of the order, to aid the secular clergy, and on no account to discuss political questions. At that time the Jesuits were forbidden to set foot in England on pain of death; and Parsons landed at Dover in a military disguise. He encouraged the secular priests, then closely in hiding, converted many of the nobility, and set us a secret press, which was transferred from place to place, at his order, and printed controversial tracts, among them Parson's *Brief Discourse* (1581) and Campion's well-known *Decem Rationes* (1581). Campion was at last seized, but Parsons escaped to Normandy (1581). He continued, however, to devote his energies to the restoration of the Roman Catholic Church in England, and did everything possible to promote the attempted invasion of England in 1588 by Philip II., of Spain, which ended so disastrously in the

defeat of the Armada. For a short time in 1588 he was rector of the English College at Rome, and in 1582–92 established various schools and seminaries in France and Spain for English Catholics. From 1597 until his death he was rector of the English College, and later was made Prefect of the Jesuit mission. By virtue of this office, confirmed to him in 1606, he had direct control of all foreign seminaries governed by the order. He was an indefatigable worker, an unrivaled controversialist, and a writer the clearness and simplicity of whose English has been highly praised. His *Book of Resolution, or the Christian Dircetory* (1582, and subsequently enlarged) was often reprinted, and Dean Stanhope prepared a Protestant edition of it (1700). Consult: More, *Historia Provineiæ Anglicanæ Societatis Jesu* (1660); Gee, *The Jesuits' Memorial* (1690).

PAR'SONS, Samuel Holden: lawyer and soldier: 1737, May 14—1789, Nov. 17; b. Lyme, Conn.; son of the Rev. Jonathan Parsons. He graduated at Harvard 1756; studied law, and was admitted to practice 1759; and was a member of the state assembly 17 consecutive sessions. In 1773 he acted on a state committee of inquiry, and was the author of the plan for a congress, which met later in New York. He became king's attorney 1773, and settled at New London. He served from 1770 as major of 14th militia regiment and 1775, Apr. 26, became colonel of the 6th regiment at Roxbury, Mass., and later at New York. On information from Benedict Arnold, he planned, Apr. 27, the capture of Ticonderoga; and with a few associates, and means secured by his own bond, carried a party of picked men to meet Ethan Allen with a small force hastily raised, at Bennington, Vt. Under Allen's command, 83 men surprised the fort and took 50 prisoners, May 9. Parsons was in the battle of Long Island, 1776, Aug.; was made brigadier-general soon afterward; was made major-general, 1780, succeeded Putnam in command of the Conn. line, and served to the close of the war. He settled after the war at Middletown, Conn., was one of the originators of the plan to settle Ohio, was named by Washington the first judge for the Northwest Territory, 1788, and settled near Marietta, O. He was drowned on his return from service as an Indian commissioner.

PAR'SONS, Theophilus, ll.d.: jurist: 1750, Feb. 24—1813, Oct; b. Byfield, Mass., son of the Congl. minister of that place. He was graduated at Harvard 1769, and began to practice law 5 years later at Portland, then a part of the town of Falmouth. On the destruction of the place by British ships, 1775, he returned to his native place, afterward settled in Newburyport, and finally 1800 in Boston, where, from 1806 to his death, he was chief justice of the supreme judicial court. In

1779 he opposed the constitution submitted by the Massachusetts legislature, and was member of the convention which prepared the constitution that was adopted. In 1888, as member of the convention to ratify the federal constitution, he was prominent in conciliatory measures. His law practice was extensive in the eastern states; his scholarship superior. No Federalist leader was more prominent and influential than he; and his Essex co. convention report, 1776, known as the 'Essex Result,' written at the age of 26, is regarded as the first and fullest exposition of republican principles in our national history. Judge Parsons died in Boston. His judicial opinions were published under the title *Commentaries on the Law of the United States*, and are valuable, especially on the 'laws of pleading, marine insurance, and real property.'

PAR'SONS, Theophilus, ll.d.: jurist: 1797, May 17—1882, Jan. 28; b. Newburyport, Mass.; son of Theophilus Parson, ll.d. He graduated at Harvard 1815; practiced law in Taunton, Mass., and later in Boston. In 1848 he was appointed law prof. in Harvard Univ.; resigned 1869. He established and edited the *United States Literary Gazette*, and was a contributor to the *N. Amer. Review* and other periodicals. His law publications were: *The Law of Contracts* (1853); *Elements of Mercantile Law* (1856); *Laws of Business for Business Men* (1857); *Treatise on Maritime Law* (1859); *The Law of Promissory Notes and Bills of Exchange* (1863); *The Law of Partnership* (1867); *Marine Insurance and General Average* (1868); *The Political, Personal, and Property Rights of a Citizen of the United States* (1875). Besides these, he published, accordant with Swedenborgian doctrine, of which he was an earnest and able advocate, *Sunday Lessons* (1838); *Essays* (1845), and second series (1855) on the senses, sorrow, Sabbath, duty, death and life, etc.; and *Deus-Homo, God-Man* (1867); also a philosophical work, *The Infinite and the Finite* (1872). A new edition of his work on business is entitled *Laws of Business in all the States and Territories and Canada.*

PAR'SONS, Thomas William, m.d.: poet and translator: 1819, Aug. 18—1892, Sept. 3; b. Boston, Mass. He was educated at the Boston Latin school; visited Italy 1836, and studied Italian literature; translated the first 10 cantos of Dante's *Inferno* (Boston 1843); returned home, studied and practiced dentistry; then resided several years in England; and from 1872 applied himself wholly to literature. A volume of his poems, *Ghetto di Roma*, was published 1854; and his completed translation of the *Inferno* with illustrations 1867; also *The Magnolia* (1867 printed privately); *The Old House at Sudbury* (1870); and *The Shadow of the Obelisk* (London 1872). In Longfellow's *Wayside Inn*, the poet is Parsons, to whose verse are applied the terms

'tender, musical, and terse.' He continued to contribute occasional poems to publications in Boston, and elsewhere till his death, but was, as Longfellow said,

"——not too eager for renown,
Accepts, but does not clutch the crown."

PAR'SONS, William Barclay, C.E.: American civil engineer: b. New York, 1859, Apr. 13. He was graduated from Columbia 1879, and from the Columbia School of Mines 1882. He at once entered the service of the Erie railroad, resigning after a few years to take up general practice as consulting engineer. From 1894-1904 he was chief engineer of the Rapid Transit Commission of New York, and designed and carried out the underground railway there. He has been connected professionally with railroad construction in various parts of the world, especially in China, was a member of the Isthmian Canal Commission 1904, and a member of the board of consulting engineers of the Panama Canal 1905, and besides contributing to various periodicals and to the *Encyclopedia Americana*, has published *Track* (1885); *Turnouts* (1885); *An American Engineer in China* (1900).

PAR'SON'S CASE: in American legal history, a celebrated law suit by Patrick Henry (q.v.) as attorney for Rev. James Maury 1763, at the Hanover County court in Virginia. The action involved the constitutionality of the 'option law' or 'twopenny act,' passed by the Virginia legislature 1785. The act affected each parish minister, compelling him to receive the value of the 16,000 pounds of tobacco, due for his year's services, in paper money of the colony, amounting to £133 instead of £400 sterling, the selling value of the tobacco. The clergy appealed to the crown. The crown vetoed the law. Rev. James Maury having sued for damages, the court squarely 'adjudged the act to be no law,' and decided for the plaintiff. A new trial was allowed on demurrer, and Henry was retained as counsel for the defendant. His eloquence induced the jury to return one penny damages for the plaintiff.

PARSONS COLLEGE: located at Fairfield, Iowa, established 1875, under the control of the Presbyterian Church. The work of the college is arranged in three courses, classical, scientific, and philosophical, which lead respectively to the three degrees of A.B., B.S., *and* PH.B.; there is also a normal training course, a business course, and a preparatory department. The grounds and buildings are valued at over $80,000; the productive funds amount to $252,000, and the annual income to $20,000. The students number about 250, and the faculty 20.

PARS'WANATHA: the 23d of the deified saints of the Jainas, in the present era. He and *Mahavîra*, the 24th, are held in highest esteem, especially in Hindustan. In

a suburb of Benares, called Belupura, there is a temple honored as the birthplace of Pârs'wanâtha. See JAINAS.

PART, n. *pârt* [F. *part*, a share—from L. *partem*, a part, a piece or portion: It. *parte*]: a piece or fragment separated from a whole thing; a portion or share; something less than the whole; an ingredient; a proportional quantity; concern or interest; a character or personage in a play; something relating or belonging to, as, for my *part;* particular office or character; side; partly: in music, one of several series of sounds performed simultaneously: v. [L. *partīrĕ*, to part, to share: F. *partir*, to set out, to go away]: to separate or divide; to distribute; to break, as a rope; to keep asunder; to be separated; to quit each other; to go away; to take or bid farewell; to have share. PARTS, n. plu. *pârts*, powers; accomplishments; quarters; districts. PART'ING, imp.: adj. serving to part; separating: n. a separation; in *geol.*, any thin, subordinate layer occurring between two main beds; a joint or fissure, as in a coal-seam. PART'ED, pp.: adj. separated; divided; in *bot.*, subdivided into similar segments, the divisions extending nearly to the base. PART'ER, n *-ėr*, one who parts. PART'LY, ad. *-lĭ*, in part; not wholly. PARTIBLE, a. *pârt'ĭ-bl*, that may be separated; divisible. PART'IBIL'ITY, n. *bĭl'ĭ-tĭ*, susceptibility of division or severance. IN GOOD PART, in a friendly manner. IN ILL PART, with displeasure. FOR THE MOST PART, commonly. FOR MY PART, so far as it concerns me; for my share. IN PART, in some degree; partly. PART AND PARCEL, an essential portion; a part. PART OF SPEECH, one of the classes of words into which the language is grouped. TO PART WITH, to quit; to resign; to be separated from. PARTING, in *founding*, the act of separating the different parts of a mold-box. Also applied to the process of making the sand-joint between two contiguous mold-boxes. Also to the joint itself. SYN. of 'part, n.': portion; fraction; fragment; quantity; member; particular; share; constituent; division; section; concern; interest; office; business; duty; action; conduct—of 'parts': qualities; powers; faculties; accomplishments; quarters; regions; districts.

PARTAKE, v. *pâr-tāk'* [*part*, and *take*]: to share in common with others; to participate; to share; to be admitted to. PARTA'KING, imp. PARTOOK', pt. *-tuk'*, did partake. PARTAKEN, pp. *pâr-tā'kn*. PARTA'KER, n. *-kėr*, one who partakes; a sharer; an accomplice; an associate.

PARTERRE, n. *pâr-tār* [F. *parterre*, a flower-garden —from *par*, on; *terre*, the ground: L. *per*, along; *terra*, the ground]: in gardens laid out in the old French style, the open part in front of the house, in which flower-beds, evergreens, walks, and closely-cut lawn were intermingled according to a regular plan.

PARTHENIC ACID, n. *pâr-thĕn'ĭk ăs'ĭd:* in *chem.*, acid found in distilled chamomile water after long keeping. It forms a crystalline calcium salt.

PARTHENIUS, *pâr-thē'nĭ-ŭs:* Greek elegiac poet of the 1st century B.C. He was a native of Nicæa in Bithynia, was taken to Rome as a prisoner in the war with Mithridates, was soon freed, and became the friend, possibly the Greek teacher, of Virgil, and the intimate of Cornelius Gallus. Virgil borrowed from him a line in the first Georgic (437); and for Gallus he composed in prose a resumé of love myths suited for elegiac poetry, which still exists under the title Περὶ ἐρωτικῶν παθημάων, *On Love's Sufferings*, and is edited in Sakolowski and Martin's *Mythographi Græci* (1896–1902). Only a few fragments of the many poems, elegies, epicedes, etc., remain.

PARTHENOGENESIS, n. *pâr'thē-nō-jĕn'ĕ-sĭs* [Gr. *par'thenos*, a virgin; *gennăō*, I produce; *genĕsis*, generation]: generation from unimpregnated ovum; reproduction of plants or animals without the immediate stimulus of the male principle. The term, introduced by Prof. Richard Owen, was extended by him to included reproduction where no ova are present, such as fission, internal cell-division, and budding (see GENERATIONS, ALTERATION OF). But the etymology implies ovary. *Agamogenesis* (literally, without-marriage reproduction) is a synonym that has come into use, and is preferable as having the Gr. privative-negative *a;* it does not imply parent, in the ordinary sense. However, in the light of philosophical biology, it matters little; since there is a fundamental likeness in all reproduction, whether in lower or higher forms, and in animals or plants. In all, it is the separation of a part to constitute a new individual. In the lowest, the unicellular organisms, there is a splitting (fission) of one into two or more individuals, or an internal breaking up into many. A little higher, the sponges are hermaphroditic and produce eggs. Next higher, in hydrozoa, separate sexes begin to appear; but there is added the process of external budding, which, if internal and not dependent on fertilization, is regarded as parthenogenesis. Many animals, all the way up to crustacea, can reproduce lost parts by a kind of budding. In all reproduction there is multiplication of cells at some point, and specialization of one or more. Ovulation, even in its highest viviparous result, begins with development of a cell; an egg, indeed, is a typical cell—a mass of protoplasm with a nucleus or germinative vesicle and a nucleolus or germinative spot; and its development begins in segmentation, like the cell-division of the lowest protozoan. In higher forms of reproduction, it has been suggested that all the cells of the organism become so specialized that none have the general properties of a cell capable of spontaneously reproducing the organism; and so there needs

to be one or more cells set apart for this purpose in a receptable or ovary; and the high grade of the organism requires that this cell be re-enforced for its work. Sexual reproduction in the more complex classes, is in almost all instances supplementary to the other mode; in some, as in plant-lice, it greatly multipnes a race otherwise in danger of extinction; but the process is an exhaustive one of virtual self-division, if definitely continued. In many of the lowest organisms there is occasional conjugation, with no sign of sex, but only a coalescence of nuclei. (See REPRODUCTION.) Consult Taschenberg, *Historische Entwickelungen der Lehre von der Parthenogenesis* (1893).

PARTHENON, n. *pâr'thē-nŏn:* the temple of Minerva in the Acropolis of Athens: one of the most celebrated of the Greek temples, and usually regarded as the most perfect specimen of Greek architecture. The Parthenon or Temple of Athena Parthenos (the Virgin) was 228 feet long 101 feet broad, and 66 feet high. It was built under the administration of Pericles, and finished in 438 B.C. It was of the Doric order of architecture, and was built of marble, resting upon a basement of limestone. It had columns on all sides, 8 at either front and 17 at the sides, counting the corner columns twice. These columns were fully six feet in diameter at the base, and 34 feet high. The structure was adorned both within and without with statues, reliefs, and other sculptures. Inside the temple stood the statue of Athena by Phidias, a masterpiece of art, nearly 40 feet high, the unclothed portions formed of ivory, the drapery of plates of gold, the weight of which was estimated at 44 talents. The Parthenon remained almost entire till 1687, when it was much injured by an explosion of gunpowder during the siege of Athens by the Venetians. It is now a magnificent ruin. Its two pediments represented, respectively, the contest of Poseidon and Athena for Athens and the birth of the goddess, while the metopes represented a number of events in which the goddess or heroes connected with Athens took part. A great number of these sculptures are now in the British Museum. In the whole of this mutilated building we find an indescribable expression of grandeur and sublimity. See ATHENS; GREECE; GREEK ART AND ARCHITECTURE; ACROPOLIS.

PARTHENOPE, n. *pâr-thĕn'ŏ-pē* [L. and Gr. *Parthenŏpē,* one of the Sirens]: in *anc. myth.,* one of the Sirens, who threw herself into the sea because she was unable to beguile Ulysses by her songs: a genus of decapodous crustaceans; one of the smaller planets.

PARTHENOPEAN REPUBLIC, *pâr-thĕn-ō-pē'an* [from *Parthenope,* the oldest name of the city of Naples]: the name given to the state into which the kingdom of Naples was transformed by the French republicans, 1799, Jan. 23, and which lasted only till the following June, when the invading army was forced to retreat.

PARTHIA, *pâr'thĭ-â:* anciently a country of w. Asia, at the s.e. end of the Caspian Sea, from which it was separated by a narrow strip, known as Hyrcania. P. now forms the n. portion of the province of Khorassan, and is almost wholly mountainous. Its rivers are merely mountain torrents supplied by the melting snow on the Elburz range during winter and spring, and mostly dry in summer and autumn.

The original inhabitants are believed to have been of Scythian race, as shown by their language as well as by their manners, and to belong to the great Indo-Germanic family. If this be the case, as is very probable, the term Parthian, from its analogy to the Scythian word *parthe*, banished, seems to indicate that they were a tribe who had been driven to P. out of Scythia (i.e., central Asia). The Parthians, during the time of the Roman Republic, were distinguished by primitive simplicity of life and extreme bravery, though given to bacchanalian and voluptuous pleasures. They neglected agriculture and commerce, devoting their whole time to predatory expeditions and warfare. They fought on horseback, and after a peculiar fashion. Being armed solely with bows and arrows, they were rendered defenseless after the first discharge; and, to gain time for adjusting a second arrow to the bow, turned their horses, and retired, as if in full flight, but an enemy incautiously pursuing, was immediately assailed by a second flight of arrows; a second pretended flight followed, and the conflict was thus carried on till the Parthians gained the victory, or exhausted their quivers. They generally discharged their arrows backward, holding the bow behind the shoulder; a mode of attack more dangerous to a pursuing enemy than to one in order of battle. The Parthians appear in history first as subject to the great Persian Empire. After the death of Alexander the Great, P. formed part of the Syrian kingdom, but revolted under Antiochus II., and constituted itself into an independent kingdom under the *Arsacidæ* (see ARSACES), B.C. 250, a race of kings who exercised the most completely despotic authority ever known, treating their subjects as the vilest of slaves; yet so accustomed did the Parthians become to this odious rule, that some of the later monarchs, who had received a Roman education, and after their accession treated their subjects with ordinary justice and humanity, were completely despised. The capital of the Parthian monarchy was Hecatompylos ('city of the hundred gates'), now Damgan. The Parthian dominion rapidly extended to the Euphrates on the w. and the Indus on the e., and became a most powerful and flourishing empire: Seleucia, Ctesiphon—capital of the Persian emperors of the Sassanidæ—and other celebrated cities date their rise from this period, and soon eclipsed, in size and splendor, the ancient Hecatompylos. In spite of repeated attacks by the Romans, the Parthians maintained their independence (see CRASSUS); and though Trajan,

A.D. 115-116, seized certain portions of the country, the Romans were soon compelled to abandon them. In 214, during the reign of Artabanus IV., the last of the Arsacidæ, a revolt, headed by Ardshir, son of Babegan, broke out in Persia, and the Parthian monarch, beaten in three engagements, lost his throne and life, while the victor substituted the Persian dynasty of the SASSANIDÆ (q.v.) for that of the Arsacidæ. Some scions of the Parthian royal family continued for several centuries to rule the mountainous district of Armenia, under the protection of the Romans, and made frequent descents upon Assyria and Babylonia; but their history is obscure and unimportant.

PARTHIAN ARROW, *pâr'thĭ-ăn:* a shaft aimed at an adversary while pretending to fly from or avoid him; a figure derived from the habit of the ancient Parthians in war.

PARTIAL, a. *pâr'shăl* [F. *partial,* partial—from mid. L. *partĭālis*—from L. *partem,* a part]: inclined to favor one party in a cause, or one side of a question, more than another, irrespective of principle or justice; unduly biased or prejudiced: not general or universal: in *familiar language,* inclined more strongly toward one thing than another: in *bot.,* applied to a subordinate part in some general arrangement. PAR'TIALLY, ad. *-lĭ,* in a partial manner; in part; not totally. PAR'TIAL'ITY, n. *shĭ-ăl'ĭ-tĭ,* inclination to one party or side more than to another; an undue bias of mind; special fondness or inclination for. PAR'TIALIST, n. *-shăl-ĭst,* one holding that the atonement affects the elect only. PARTIALISE, v. *pâr'shăl-īz,* in *OE.,* to make partial. PARTIAL LOSS, in the *law of marine insurance,* a loss not total; in which case the insurer is not entitled to abandon the remains of the ship or cargo and then claim the entire insurance money; but is bound to keep his ship or goods, and to claim only in proportion to his actual loss or damage.

PARTIAL TONE: one of the simple tones entering into the composition of a complex tone. The fundamental is the first partial tone, the first over-tone is the second partial, etc.

PARTICEPS CRIMINIS: in law, a term used to denote that a party is a partner in the crime alleged.

PARTICIPATE, v. *pâr-tĭs'ĭ-pāt* [L. *participātus,* made partaker of—from *pars* or *partem,* a part; *capĭo,* I take: It. *participare:* F. *participer*]: to share; to have a share in common with others; to receive a part of. PARTIC'IPATING, imp. PARTIC'IPATED, pp. PARTIC'IPATOR, n. *-tėr,* one who partakes with another. PARTIC'IPA'TION, n. *-pāshŭn* [F.—L.]: state of sharing in common with others; the act or state of having a part of something; a division into shares. PARTIC'IPATIVE, a. *-tĭv,* able or tending to participate. PARTIC'IPATIVELY, ad. *-lĭ.* PARTIC'IPANT, n. *-ĭ-pănt* [F.]: one who partakes or shares.

PARTICIPLE, n. *pâr′tĭ-sĭ-pl* [F. *participe*, a participle—from L. *particip′ĭŭm*, a participle—from *pars* or *partem*, a part; *capĭo*, I take: It. *participio*]: in *gram.*, one of a class of words of the nature partly of a verb and partly of an adjective. PAR′TICIP′IAL, a. *-sĭp′ĭ-ăl*, having the nature and use of a participle; formed from a participle. PAR′TICIP′IALLY, ad. *-lĭ.*—The *Participle*, classed by some grammarians as a distinct part of speech, is classed more commonly as a part of the conjugation of the verb. There are in English two participles, one in *ing*, called usually the present, but properly the imperfect, because it expresses continued, unfinished action, e.g., *loving*, *writing;* and the other expressing past action, and ending either in *ed* (*t*) or in *en*, e.g., *loved*, *written.* In Ang.-Sax. and Old Eng., the imperfect P. ended in *and*, e.g., *haband* (having), corresponding to the modern Ger. *habend*, Gr. *echont*(os), Lat. *habent*(is). In the sentence, 'He is *writing* a letter,' *writing* is the imperfect participle; in 'the *writing* of the letter occupies him,' or '*writing* is a difficult art,' it is a substantive, and had a different origin. In the latter case, *-ing* corresponds to the Ang.-Sax. termination *-ung*, used in forming substantives from a large class of verbs; thus, Ang.-Sax. *halgung* (hallowing) is equivalent in meaning and in etymology to Lat. *consecratio;* similarly, modern Ger. *Vernichtung*, annihilation, from *vernichten*, to annihilate. Such a phrase as, 'while the letter is writing,' seems to be a shortened form of the now antiquated, 'is a-writing,' which was originally, 'is in writing.' Although this mode of expression is liable in some cases to ambiguity, many authorities deem it terser and more idiomatic than the circumlocution of, 'is being written,' which is often substituted for it: the preference between the two has been much disputed. The verbal substantive in *-ing* is often exactly equivalent to the infinitive; thus, '*standing* long in one position is painful' = '*to stand*,' etc. It has this advantage, that while it can be construed as a noun (e.g., with a possessive case), it can retain at the same time the usual adjuncts of a verb; as, 'What are we to infer from the king's dismissing his minister?' The use of this form contributes not a little to the peculiar brevity and strength of the English language.

PARTICK, *pâr′tĭk:* town of Scotland, county of Lanark, prettily situated, chiefly on rising ground on the Kelvin, immediately above its junction with the Clyde, about three m. w.n.w. of the Cross of Glasgow, of which city it now forms a suburb. Nine-tenths of the workmen of P. are engaged in ship-building; and there are numerous ship-building yards, flour-mills, cotton factories, and bleach-fields. A large proportion of the inhabitants are engaged in business in Glasgow, and for their accommodation extensive ranges of handsome villas have been built here. Pop. (1851) 3,131; (1861) 8,183; (1871) 17,707; (1881) 27,410; (1891) 36,538.

PARTICLE, n. *pâr′tĭ-kl* [F. *particule*—from L. *particulă*, a small part—from *pars*, a part: It. *particula*]: one of the minutest parts or atoms into which matter can be mechanically divided; a very small portion or part; the component parts or granules of all solid substances; in *gram.*, a word unvaried by inflection; a small connecting word.

PARTICULAR, a. *pâr-tĭk′ū-lėr* [F. *particulier*—from mid. L. *particŭlāris*, concerning a part—from L. *particŭla*, a small part (see PARTICLE)]: not general; individual; distinctive; odd; having something that distinguishes from others, used in the sense of contempt; nice; attentive to things single or distinct; exact; minute: N. a single instance; a single point: PLU. details. PARTIC′ULARLY, ad. *-lĭ*, distinctly; in an extraordinary degree. PARTIC′ULAR′ITY, n. *-lăr′ĭ-tĭ* [F. *particularité*]: the quality of being particular; distinctiveness; peculiarity; individual characteristic; minuteness in detail. IN PARTICULAR, especially; distinctly. PARTIC′ULARIZE, v. *-lėr-īz*, to specify singly and distinctly; to enumerate in particulars or detail; to be attentive to single things. PARTIC′ULARIZING, imp. entering into particulars. PARTIC′ULARIZED, pp. *-īzd*. PARTIC′ULARIZA′TION, n. *-ĭ-zā′shŭn*, the act of particularizing.—SYN. of 'particular, a.': distinct; peculiar; single; one; fastidious; appropriate; circumstantial; individual; special; especial; respective; specific; precise; critical.

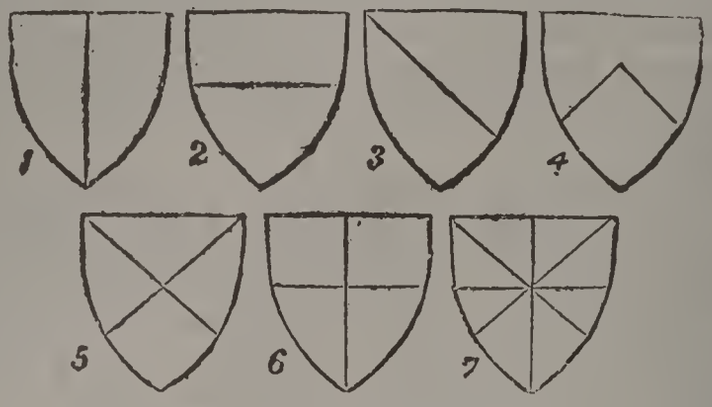
PARTING: see under PART.

PARTINICO, SALA DI, *sâ′lâ dē pâr-tē′nē-kō:* post-town of Sicily, the province of Palermo, 19 m. s.w. of the city of Palermo, at the foot of a grand precipice of red limestone. The plain in the vicinity is of surpassing fertility; corn, wine, oil, fruit, and sumach are produced in rich abundance; and linen and woolen goods are manufactured. Scattered vestiges of ancient habitations are still seen on the summit of the height above the town, and are said to be the ruins of the ancient *Parthenicum* mentioned in the *Itinerary* of Antoninus, and there only.

PARTITE, a. *pâr′tīt*, or PART′ED, a. [L. *partītus*, divided or shared]: in *bot.*, divided to near the base, the divisions being called *partitions*.

PARTITION, n. *pâr-tĭsh′ŭn* [F. *partition*—*from* L. *partitĭōnem*, a parting, a partition—from *partĭo*, I part I, divide—from *pars*, a part]: division; separation; that by which things are separated; a separate part: in *music*, called also PARTITURA (see SCORE): V. to divide into distinct parts; to separate by a partition. PARTI′TIONING, imp. PARTI′TIONED, pp. *-ŭnd*. PARTITIVE, a. *pâr′tĭ-tĭv*, distributive; denoting a part: N. in *gram.*, a word expressing partition, or denoting a part; a distributive. PAR′TITIVELY, ad. *-lĭ*. PARTITION LINES, in *heraldry*, lines dividing the shield in directions corresponding to the ordinaries. According to the direction of the parti

tion lines, a shield is said to be party or parted per fess, per pale, per bend, per chevron, per saltire: a shield



Partition Lines in Heraldry.

divided by lines in the direction of a cross, is said to be quartered; and a shield parted at once per cross and per saltire, is said to be Gironné (q.v.) of eight. The partition lines are not always plain; they may be engrailed, invected, embattled, wavy, nebuly, indented, dancetté or raguly: see separate titles.

PARTI′TION, in Building: thin interior wall dividing one apartment from another; usually of brickwork about 4½ or 9 inches thick, or of timber with standards about 4½ inches thick covered with lath and plaster. Wooden partitions are used when there is no sufficient support for brick, stone, or iron. When wooden partitions have to support much weight, they ought to be constructed in the form of a Truss (q.v.).

PARTI′TION, in Law: division of an estate between two or more joint owners; strictly, such division of real estate, as lands, hereditaments, and tenements, but less properly, division of goods and chattels between coparceners. The P. is *voluntary* when made by mutual consent of the parties in interest, and then each conveys or releases to each the share that each is to hold. The P. is *compulsory* when made by a court without the consent of one or more of the persons interested: in that case the P. is effected by the judgment of the court and by the delivering up of possession in accordance therewith. Courts of equity have jurisdiction in P. cases where the law affords no adequate remedy, e.g., where the alleged titles are equitable only, or where the necessity is involved of one coparcener's making to another or to others compensation for the purpose of equalizing the partition.

PARTIZAN, or PARTISAN, n. *pâr′tĭ-zăn* [OF. *pertuisane*, a partizan or leading staff: It. *partigiana*, a weapon like a halberd: mid. L. *partesana:* comp. O.H.G. *partâ*, a battle-ax—connected with PARTIZAN 2—comp. also *halberd*]: a kind of halberd: a pike or truncheon; a marshal's baton.

PARTIZAN, or PARTISAN, n. *pâr'tĭ-zăn* [F. *partisan*, a partner, a partizan—from *parti*, a party, a faction: It. *partigiano*, a partizan: comp. L. *partīrī*, to divide, to part]: adherent to a party or faction; one devotedly and violently attached to a party or interest: in *milit.*, light troops engaged in desultory warfare, or the officer who leads them; such troops harass the enemy by cutting off stragglers, interrupting supplies, etc.: ADJ. pertaining to a party or faction; biassed in favor of a party or interest. PAR'TIZANSHIP, n., or PAR'TISANSHIP, *-shĭp*, state of being a partizan; feeling or conduct appropriate to a partizan; devotion to party.

PARTNER, n. *pârt'nĕr* [prov. F. *partener*, to partake: OF. *parcener* and *parsonnier*, a partaker, a partner—from L. *pars*, a part]: one associated with another or others in business pursuits; sharer; associate; one who dances with another; a husband or wife: PLU. heavy framework fitted on the deck of a ship to receive a mast, a pump, etc.: V. to join; to associate with. PART'NERSHIP, n. joint or common interest or property; union of two or more in the same profession or trade (see below).

PART'NERSHIP, in Law: union of two or more individuals acting under a contract, whereby they mutually contribute property or labor for making profits jointly. When a P. is confined to a particular transaction or speculation, it is called, usually, a joint-adventure, and the parties are joint-adventurers. The usual criterion by which a P. is ascertained to exist, as distinguished from other arrangements, is that there is a community of profit; it is not essential that both should suffer losses equally or proportionably, for one partner may stipulate that he shall not be liable to loss. This stipulation is binding between the partners, but does not prevent the partners all from being liable to third parties. So one partner may contribute all the capital or all the labor. A dormant partner is one whose name does not generally appear to the world as a partner, but who nevertheless is to all intents and purposes a partner, with rights and liabilities equal to the rest. In order to constitute that kind of community of profit which is the chief element in P., it is necessary that the partner share in the profits as a *partner;* for, in many cases, clerks, servants, or agents receive a commission or remuneration proportioned to profits, and yet are not partners, for this is merely one mode of ascertaining the salary which they are to receive. In all such cases, therefore, the distinction as to whether there is a P. or not turns on the consideration whether the alleged partner receives, as such, a share of the profits, or receives merely a salary proportioned to profits without having a specific interest in the firm. The contract of P. may be entered into either by word of mouth or in writing. If no specified term be agreed upon, it is a P. at will, and may be dissolved by either of the parties at pleasure. Sometimes, also, a court of equity will inter

fere to dissolve the P. before the time appointed; but this only happens when some unforeseen and urgent reason exists, as that one of the partners has become a lunatic, or has proved grossly dishonest, or grossly careless and wasteful in the administration of the P., or the object of the partnership cannot be carried out. Mere differences of opinion on minor matters are no ground for seeking a dissolution. The partners may validly make any arrangements between themselves that they think proper, provided they are not void as against the statutes or the general principles of the law, even though they be in conflict with the ordinary rules of P., but if these are unusual and special stipulations, there is no certainty of securing adherence to them without a formal deed or indenture of P. being executed. Thus, it is common to stipulate as to the capital each is to contribute, and as to the proportion of profits each is to receive, as to what is to be done in case of the death of a partner, etc. Unless a stipulation is made to the contrary, the rule is, that the death of one of the partners dissolves the P.: so does his bankruptcy. It is a rule also that no new partner can be introduced without the consent of the rest. As against third parties, whatever may be the secret arrangements between members of a firm, the rule is, that any partner can bind the firm in all matters which are within the scope of the P., each being by the nature of the contract made the agent of all the rest for business purposes. Thus, any one may accept a bill in the name of the firm, provided that be one of the modes of doing business. It is, however, to be borne in mind, that the firm is bound by one of the partners in those matters only which are strictly within the proper business of the firm—an important qualification of the general power. Within the above limits, each partner can bind his copartners, however imprudent or foolish his act; since it is one of the implied conditions, that all have full confidence in each other. It follows from this principle, that the firm is liable for the dealings of each partner on its behalf within the scope of the P., and each is liable to the full extent for all the debts of the firm; in short, each is liable to his last dollar for the solvency of the firm. Hence, it is often of importance for a partner, on leaving the firm, to know how to terminate this liability. The rule is, that as regards all strangers, notice fairly given in the public newspapers is sufficient: but as between the firm and those who have had dealings with it, the notice in the newspapers is of no use, unless it can be proved that the party had actual notice given to him—and hence a circular notice sent to customers announcing the fact of retirement, is the only course effectual.

The practice of individuals entering into large associations, now called joint-stock companies, which were originally only extended partnerships, has led to separate statutes as to these: see JOINT-STOCK COMPANIES.

A person who holds himself out to be a partner in a

nrm, or who suffers his name to stand before the public as the name of a partner, is liable as a partner; and his liability rests, not on the ground of any transaction, actual or presumptive, between him and the real partners, but on the ground of public policy, with a view to the prevention of frauds on creditors. The lending of his name may be express or tacit: by permission to the firm to use his name, or by neglecting to forbid the use of it. Proof of his permission, connivance, or guilty negligence would be his permitting his name to be coupled with those of the real partners on a sign, on bill-heads, or the like, or his suffering his agents to do acts sufficient to lead others to consider him a partner. A *special* partner is liable to the extent of his contribution to the firm's capital: in many of the states the laws now recognize limited partnerships in which the liability of all parties is limited.

PARTON, *pär'ton*, JAMES: 1822, Feb. 9—1891, Oct. 17; b. England: author. He came in early childhood to New York; was teacher at White Plains, N. Y., Philadelphia, and New York, and was a writer on the staff of the *Home Journal* for several years. Since 1875 he has lived in Newburyport, Mass. He has published: *Life of Horace Greeley* (1855); *Humorous Poetry of the English Language* (1857); *Life and Times of Aaron Burr* (1857); *General Butler in New Orleans* (1863); *Life and Times of Benjamin Franklin* (1864); *Smoking and Drinking* (1868); *The People's Book of Biography* (1868); *Famous Americans of Recent Times* (1870); *Triumphs of Enterprise, Ingenuity, and Public Spirit* (1871); *Topics of the Time* (1871); *Words of Washington* (1872); *Life of Thomas Jefferson* (1874); *Caricatures in All Times and Lands* (1875); *Life of Voltaire* (1881). Other works are: *Life of John Jacob Astor*, *The French Parnassus*, *Manual for the Instruction of 'Rings,' Railroad and Political*, *How New York City is Governed* (1866), *The Danish Islands*, etc. An astonished critic quotes from his life of Burr to the effect that Burr's greatest fault was his generosity. —SARA PAYSON (WILLIS) (ELDREDGE) P. (pen-name FANNY FERN), his wife (1811, July 7—1872, Oct. 10; b. Portland, Me.); daughter of Nathaniel Willis (q.v.), and sister of Nathaniel P. Willis (q.v.), and widow of Charles H. Eldredge, a banker in Boston. She was married to James P. 1856. Her first collection of newspaper essays was *Fern Leaves* (1853), which had immense sale. This was followed by a second series (1854); *Ruth Hall; Rose Clark* and *Fresh Leaves* (1857); *The Play-Day Book* (1857); *Folly as It Flies* (1868); *Ginger-Snaps* (1870); *Caper-Sauce* (1871). The last two titles well characterize her general vivacious style of writing. See *Fanny Fern: a Memorial Volume*, by James Parton (1873).

PARTOOK: see under PARTAKE.

PART-OWNER: person who owns a thing in common with other persons. The term part-owners is used particularly with regard to persons owning a vessel together, but not as partners. Separate property in the thing which is the subject of part-ownership is acquired by Partition (q.v.). Part-owners cannot encumber or transfer more of the common property than their own shares; they are not agents for one another. The owners of the majority of the shares in a ship may lawfully employ her against the will of the minority, but the admiralty court may compel them to insure the minority against loss: the minority have the same right under the same conditions. Where the part-owners are equally divided as to the employment of the vessel, a court often orders a sale of the common property. The part-owners are bound *in solidum* by the lawful engagements of their duly-constituted agents, i.e., they are liable jointly and individually to make good the undertakings of their agents, when the agents have not transcended the limits of their authority.

PARTRIDGE, n. *pârʹtrĭj* [F. *perdrix*—from L. *perdix* or *perdīcem*, a partridge: Gr. *perdix*], (*Perdix*): genus of gallinaceous birds, of family *Tetraonidæ*, having a short, strong bill, naked at the base; the upper mandible convex, bent down at the tip; the wings and tail short, the tarsi as well as the toes naked, the tarsi not spurred.—The Common P. or Gray P. (*P. cinerea*), is the most plentiful of all game-birds in Britain, and becomes increasingly plentiful as cultivation is extended, while the range of the moorfowl is restricted. On the continent of Europe, it is abundant in almost all districts suitable to its habits, from Scandinavia to the Mediterranean; and is found also in n. Africa, and in some parts of w. Asia. It varies considerably in size; those found in rich lowlands being generally the largest, about 12½ inches in entire length; while those which inhabit poorer and upland districts are smaller. The female is rather smaller than the male. The upper parts of both are ash-gray, finely varied with brown and black; the male has a deep chestnut crescent-shaped spot on the breast, almost or altogether lacking in the female. A variety called the Mountain P. has the plumage brown. The P. is seldom found far from cultivated land. It feeds on grain and other seeds, insects and their larvæ and pupæ, and the pupæ of ants are generally the food sought at first for the young. The nest is commonly on the ground, among brushwood and long grass, or in fields of clover or grain, and usually contains 12 to 20 eggs. The young run as soon as they are hatched. Both parents show very strong attachment to their young, and great courage in repelling assailants; they have also recourse, like many other birds, to stratagem, to draw off in another direction the most powerful and dangerous enemies, such as dogs; fluttering close before them as if broken-winged, while the brood escape. Until the end of autumn, the parent birds and their brood

keep together in a *covey;* late in the season, several coveys often unite into a *pack,* when it becomes much more difficult for the sportsman to approach them. The flight of the partridge is strong and rapid for a short distance, but it does not seem capable of long-sustained flight. The eggs of partridges are often hatched, and the young birds reared, by the domestic hen, the chief requisite being a plentiful supply of ants when the birds are very young. Partridges thus reared become very tame, but they seldom breed in the aviary.—The Red-Legged Partridge (*P. rufus,* or *Caccabis rufus,* the genus or sub-genus *Caccabis* being distinguished by a rudimentary blunt spur on the tarsi) is native of s. Europe and of the Channel Islands, and is now plentiful in parts of England, particularly Norfolk and Suffolk, into which it has been introduced. It is rather larger than the common partridge, stronger on the wing and less easily approached by the sportsman: it is less esteemed for the table. The upper parts are of reddish-ash color; the throat and cheeks white, bounded by a collar of black, which expands in black spots on the breast; and the sides exhibit bars of black. The plumage is smooth.—Two other species, nearly allied to this, are found in some southern parts of Europe. India has a number of species. The habits of all the species much resemble those of the Common Partridge.—The name partridge is sometimes loosely extended to include the species of *Ortyx* (see Virginian Quail), though it seems undesirable to have two names for the same bird; and in South America it is sometimes given to the Tinamous. As to pheasants, they are of another family, not belonging at all to the new world.

The term 'Partridge' originally belonged to the gray partridge (*Perdix cinerea*) of Great Britain, but was extended to all the sub-family Perdicinæ, exclusively of the old world, and including quails—the true quail being the migratory one of s. Europe (*Coturnix dactylisonans*), which has been introduced somewhat into this country. The term partridge, however, is admissible (especially if qualified as American partridge) as applied to the sub-family Odontophorinæ, exclusively of the new world, and distinguished by a number of characters, notably by notched mandible—hence the name of the sub-family, meaning tooth-bearing. It includes the Bob-white and the plumed and other species of the s.w. United States. The Bob-white is rightly called partridge in the middle and southern states (but there the ruffed grouse is improperly called pheasant, just as the ruffed grouse and spruce grouse are improperly called partridges in the northern states.) The sub-family Tetraoninæ, grouse, are easily distinguished by feathered shank—the exception being the ruffed grouse (*Bonasa umbella*).

PARTRIDGE, *pâr'trĭj,* Alden: American soldier: b.

Norwich, Vt., about 1785; d. there 1854, Jan. 16. He was graduated at West Point in 1806, and acted as assistant professor and afterward professor of mathematics there from that time until 1813. He was professor of engineering 1813-16, and superintendent from January 1815 to November 1816, and from January to July 1817. He resigned in 1818 and became the principal of an exploring survey sent out in 1819 to determine the northwest boundary of the United States. In 1820 he founded in his native town a military academy, afterward incorporated as Norwich University, with Partridge as its president. He subsequently founded similar institutions in Pennsylvania, Virginia, and Mississippi, was surveyor-general of his native state in 1832, and was a member of the Vermont legislature 1833-4 and 1839.

PARTRIDGE, GEORGE: statesman: 1740, Feb. 8—1828, July 7; b. Duxbury, Mass. He was educated at Harvard 1759-62; studied theology, and became a teacher at Kingston, Mass. He was a delegate to the provincial congress, 1774-5, a member of the Massachusetts house of representatives till 1779, then a delegate to the continental congress, and continuously in congress till 1785, except the congress which met at Princeton, N. J., 1783. He sat in the United States congress from its opening till 1790, when he resigned. A large part of his estate he left for charitable and religious purposes.

PARTRIDGE, JOHN: English astrologer: b. East Sheen, Surrey, 1644, Jan. 18; d. Mortlake, Surrey, 1715, June 24. He was bound to a shoemaker in early youth but contrived to teach himself Latin, Greek and Hebrew, by means of which he gained a knowledge of astrology. In 1680 he issued the first of his almanacs, *Merlinus Liberatus*, which with its rarely perfect equivocation soon gained popular favor and quack imitators. Swift, in 1708, prompted in part by a spirit of jest, and wishing also to check the flood of quack almanacs, published his *Predictions . . . by Isaac Bickerstaff*, in which he prophesied the death of Partridge at 11 o'clock at night on the 29th of March. On the 30th he published the announcement of the fulfilment of the prophecy; so thoroughly convinced was the public of its truth that Partridge was unable to establish the fact that he was living and he made no further issues of his almanac until 1714, probably deterred by Swift's continuance of the jest in *Elegy on the Death of Mr. Partridge* (1708) and *Vindication of Isaac Bickerstaff* (1709).

PARTRIDGE, WILLIAM ORDWAY: American sculptor: b. Paris, 1861, April 11. He studied at Columbia University, but after a year his health broke down and he was ordered abroad. In Naples and in Florence, under Galli, he studied modeling and sculpture, but

did not devote himself entirely to art for several years, making his living instead by public readings and for a time as an actor. He married in 1887 and went to Rome where he studied under Welonski. Upon his return to America he was for a time professor of fine arts at the Columbian University in Washington. Among his best known works are: *Nearing Home,* the bust of an old woman, now in the Corcoran Gallery, Washington; a seated Shakespeare in Lincoln Park, Chicago, which may be reckoned to present the refinement and nobility, but to lack the simplicity and power of the poet; a statue of Alexander Hamilton, in front of the Hamilton Club, Brooklyn, showing the passionate vehemence and the complete self-control of Hamilton in the Poughkeepsie convention; a very remarkable equestrian statue of General Grant for the Union League Club of Brooklyn; busts of Lincoln, Whittier, Edward Everett Hale, Wm. S. Tyler, and Walt Whitman; two ideal busts of the Madonna, the Kaufmann Memorial in Washington and the statue of Pocahontas for Jamestown Exposition in 1907. Partridge wrote art critiques and poetry—*Art for America* (1894); *Song of Life of a Seulptor* (1894); *The Tcehnique of Sculpture* (1895); *The Angel of Clay* (1900); and *The Czar's Gift* (1906), novels; and a historical study, *Nathan Hale* (1902).

PAR'TRIDGE BER'RY. See GAULTHERIA.

PAR'TRIDGE PIG'EON (*Geophaps*): Australian genus of *Columbidæ,* approaching more than most of the pigeons, in character and habits, to the true gallinaceous birds, particularly partridges. Their plumage is beautiful, and generally with bronze tinge and lustre on the wings, whence their name sometimes of Bronze-wings. There are several species. They live mostly on the ground, and rise with a whirring noise, like the pheasant, when disturbed. They are highly esteemed for the table.—*Geotrygon montana,* species of another genus of *Columbidæ,* bears the name PARTRIDGE DOVE in the W. Indies. It also seeks its food chiefly on the ground, though it frequents well-wooded districts.

PAR'TRIDGES, in Artillery: very large bombards formerly in use at sieges and in defensive works. They are mentioned in Froissart.

PAR'TRIDGE-WOOD: very pretty hard-wood from the W. Indies and Brazil; usually of reddish color, in various shades from light to dark, the shades mingled in thin streaks; but in some choice sorts they are curled upon one another, resembling the feathers of the partridge, whence its name. One variety occurs in which the colors are remarkably bright, and it is consequently called Pheasant-wood. In Brazil, this beautiful wood is so plentiful that it is employed in ship-building, and it is said to be used in British navy-yards under the

name Cabbage-wood, but this is doubtful: many woods are known as partridge-wood, and several as cabbage-wood. Among the Brazilians, it is called 'Angelim,' and they describe four sorts—*Angelim de pedra* (Stone Angelim), *A. vermelho* (Red Angelim), *A. amargoso* (Bitter Angelim), and *A. varzea* (Cultivated Angelim). Its chief use in other countries is for cabinet-work, Tunbridge-ware, parasol-sticks, fans, and other small matters for which its beauty recommends it. It is said to be yielded by the leguminous tree (*Andira inermis*), found not only in the Brazils, but in other parts of S. America and in the West Indies.

PARTS OF SPEECH: the several kinds or classes into which the words of a language are divided. There is nothing in the outward form of words that would enable us to divide them into classes. The distinction lies in the *offices* that the several words perform in a sentence (q.v.). All words performing the same office in sentences belong to the same class. The essential parts of speech are the noun, adjective, pronoun, verb, adverb, preposition, conjunction, interjection (see these several heads). The articles (q.v.) are not distinct parts of speech, being essentially pronouns. Interjections (q.v.) are by some writers considered as hardly belonging to articulate speech. To name the class or part of speech to which each word of a sentence belongs is called to *parse* it.

PARTURE: OE. for DEPARTURE.

PARTURITION, n. *pâr'tū-rĭsh'ŭn* [L. *parturitĭōnem*—from *partu'rĭō*, I bring forth]: the act of bringing forth, or of being delivered of young (see MIDWIFERY). PARTURIENT, a. *pâr-tū'rĭ-ĕnt* [L. *parturĭen'tem*]: bringing forth young.

PARTY, n. *pâr'tĭ* [F. *partie*, a part, a share; *parti*, a party or faction—from *partir*, to divide—from L. *partīri*, to part, to divide: It. *partita*, a share, a division]: a number of persons united in opinion or design in opposition to others in the same community or nation; a faction; one concerned or interested in an affair; one of two litigants; a particular person—but improperly so applied; a cause or a side; a select company or assembly; a small detachment of troops drawn from the main body; adj. that concerns not the whole; arising from party; in *her.*, used with reference to the division of a field or charge. PARTYISM, n. *pâr'tĭ-ĭsm*, devotion to party; party-spirit. PARTY-COLORED, or PARTI-COLORED, having divers colors. PARTY-FENCE, a fence between the lands of separate proprietors. PARTY-JURY, a jury consisting of half natives and half foreigners. PARTY-MAN, one holding violent party principles; a factious man. PARTY-SPIRIT, the spirit or animus that distinguishes a party. PARTY-VERDICT, a joint verdict. SYN. of 'party, n.': side; sect; litigant; cause; assembly;

meeting; person; detachment; cabal; conspiracy; combination.

PARTY-WALL: wall dividing two houses or tenements, and which is, in a certain sense, one and indivisible, though the property of two or more parties. The question as to who is the owner of any particular part of the party-wall is solved by ascertaining who is the owner of the soil on which it is built. In the absence of evidence to the contrary, it is presumed that half of the soil belongs to the owner on one side, and the other half to the owner of the other side; and unless the wall has stood twenty years and more, each owner can do what he likes with his own half, and can pare it away if he likes. But in general, mutual interests prevent each party from resorting to his strict legal rights. A practice exists for one who builds a house adjoining the wall of a neighbor, to pay for half the expense of the wall.

PARUSIA, n. *pa-rū'zĭ-a* [Gr. *parousia*, presence—from *pareimi*, pp. *parōn*, to be present—*para*, beside; *eimi*, to be]: in *rhet.*, a figure of speech by which the present tense is used instead of the past or future, and in a vivid or animated narration of past, or prediction of future, events.

PARVENU, n. *pâr'vĕ-nô'* [F. *parvenu*, an upstart—from *parvenir*, to attain to, to succeed—from L. *Pervenīrĕ*, to arrive—from *per*, through; *venīrĕ*, to come]: an upstart; one newly risen into notice or power.

PARVIS, or PARVISE, n. *pâr'vĭs* [OF. *parvis*, the porch of a church—from mid. L. *paravīsus* for *paradīsus*, the church porch, the paradise]: in *OE.*, the church porch; the room over a church porch, for a school; sometimes an open space in front of a church door. *Note.*—When the old mystery-plays were exhibited in the churchyard, the porch represented *paradise*, hence the name; the word also meant, 'an altar; a berth in a ship,' etc.—see Skeat.

PAS, n. *pâ* [F. *pas*, a step—from It. *passo;* L. *passus*, a step]: a step; in *OE.*, precedence.

PASADENA, *păs-a-dē'na:* Cal., city in Los Angeles county; on the Atchison, T. & S. F., the Los Angeles & S. L., and the Southern Pacific R.R.'s; at the head of the San Gabriel valley, twenty-five miles from the Pacific ocean and nine miles northeast of Los Angeles. There are trolley connections with Los Angeles. It was settled by Spaniards in 1771; some of the old Spanish houses are still in existence in the vicinity. In 1873 a colony from Indianapolis, Ind., located here and began raising fruit. In 1886 it was chartered as a city. Pasadena is a famous health and winter resort, on account of its equable climate and beautiful scenery. It is at the foot of the Sierra Madre range, which protects the city on the north and east, and on the

west and south are broken ranges of high hills. It is surrounded with large fruit farms. Pasadena is a residential city, but its manufacturing establishments are substantial. The packing houses, part of the year, employ 500 persons, the planing mill 100, the building trades from 600 to 800. Large quantities of fruit are exported annually. A unique feature of Pasadena is the 'Municipal Farm.' Early in its history, the people recognized that the question of sewerage would have to be solved in some unusual way. Far from the ocean and surrounded by hills and mountains, only the wash of Arroyo Seco to depend on for drainage, it seemed as if the beautiful, healthy city would soon become the home of disease. The city purchased a raw ranch of about 300 acres, six miles out, and by means of a large outfall pipe, the flow from the sewers was spread upon this land. About sixty acres were planted with walnut trees, and quite a large acreage was devoted to alfalfa. Enough alfalfa is raised to supply food for the horses of the fire and street departments, and leave a large overplus for sale. The walnuts harvested bring in market nearly $5,000. Corn, pumpkins, and other crops are raised which are fed to swine. The prominent public buildings are the churches, schools, hotels, and municipal buildings, and Pasadena Hospital. The educational institutions are the Throop Polytechnic Institute, the Pasadena Academy of Science, Saint Andrew's Academy, high school, public and parish schools, and a public library which contains nearly 25,000 volumes. The five banks have a combined capital of $500,000. The government is vested in a mayor and a council of five members, chosen by popular vote. Pop. (1900) 9,117; (1910) 30,291.

PASCAGOULA, *păs-ka-gô'la:* river, and bay at its mouth, in Miss. The river, formed by the junction of the Leaf, the Chickasawha, with numerous branches, drains the s.e. portion of the state, and flows into Mississippi Sound through two mouths which form the bay. It is navigable 100 m. through a region of pine forests.

PASCAL, *păs'kal,* F. *pâs-kâl',* BLAISE: one of the most distinguished philosophers and scholars of the 17th c.: 1623, June 19—1662, Aug. 19; b. Clermont, in Auvergne, France. His father, Étienne P., was pres. of the Cour des Aides at Clermont. His mother, Antoinette Bezon, died while he was little beyond infancy. He had two sisters—the elder, Gilberte, Madame Perier, afterward his biographer; the younger, Jacqueline, who became a nun of Port Royal, under the celebrated Mère Angelique, sister of Antoine Arnauld. From childhood, Blaise gave evidence of extraordinary abilities; and when he reached his 8th year, his father resigned his office at Clermont, and came to Paris, personally to direct the boy's education. For the purpose of concentrating all the boy's efforts on languages, his father kept out of his reach all

books treating of mathematics, for which he had evinced a taste; and it is recorded that the child by his own unaided speculations, drawing the diagrams with charcoal upon the floor, made some progress in geometry. One account represents him as having thus mastered the first 32 propositions of the first book of Euclid's *Elements*—a statement which carries its own refutation. Thenceforward, he was permitted freely to follow the bent of his genius. In his 16th year, he produced a treatise on Conic Sections, which extorted the almost incredulous admiration of Descartes. In his 19th year, he invented a calculating-machine; and turning his attention to the novel questions as to the nature of fluids, which Torricelli's theories had raised, he produced two essays, which, though not published till after his death, have established his reputation as an experimental physicist. His father having accepted an office at Rouen, P. was there brought into intercourse with a distinguished preacher, Abbé Guillebert, member of the Jansenists, a man of great eloquence, a master of ascetic theology; from whom and from other members of the same rigid sect, as well as from the writings of Arnauld, St. Cyran, and Nicole, P.'s mind received a deeply religious turn; and his health having suffered from excessive study, he gave himself up in great measure to retirement and theological reading, and to the practice of asceticism. The death of his father, and his sister Jacqueline's withdrawal to Port Royal, confirmed these habits; and to this period we owe his magnificent though unfinished *Pensées*, which have extorted the admiration even of his unbelieving, therefore unsympathizing, critics. Having fully identified himself with the Jansenist party, he was induced (1655) to take up his residence at Port Royal, though not as one of the famous 'solitaries;' and there he gave himself to religious devotion and asceticism. In the controversy to which the condemnation of Arnauld by the Sorbonne (1655) gave rise, P. took lively interest: and to this controversy he contributed the memorable *Lettres Provinciales*, published under the pseudonym 'Louis de Montalt.' These famous Letters (18, not reckoning the 19th, which is a fragment, and the 20th, which is by Lemaistre) are written, as if to a provincial friend, on the absorbing controversial topic of the day. The first three are given to the vindication of Arnauld, and the demonstration of the identity of his doctrine with that of St. Augustine. But it was to the later letters that the collection owed both its contemporary popularity and its abiding fame. In these P. addresses himself to the casuistry and to the directorial system of Arnauld's great antagonists, the Jesuits; and in a strain of humorous irony which has seldom been surpassed, he holds up to ridicule their imputed laxity of principle on the obligation of restitution, on simony, on probable opinions, on directing the intention on equivocation and mental reservation, etc. In all this, he professes to produce the authorities of their own authors. Of the extraor-

dinary ability displayed in these celebrated Letters, no question can be entertained; but the Jesuits and their friends loudly complain of their unfairness, and represent them as in great part the work of a special pleader. The quotations, except those from Escobar, were confessedly supplied by P.'s friends. It is complained that many of the authors cited are not Jesuits at all; that many of the opinions ridiculed and reprobated as opinions of the Jesuit order had been in reality formally repudiated and condemned in the Society; that many of the extracts are garbled and distorted; that it treats as though they had been designed for the pulpit, and as manuals for teaching, works which in reality were meant as only private directions of the judgment of the confessor; and that, in almost all cases, statements, facts, and circumstances are withheld, which would modify, if not entirely remove, their objectionable tendency: see JESUITS. To all which the enemies of the Jesuits reply by arguments intended thoroughly to vindicate Pascal. P. himself entertained no compunctious feeling for the production of these Letters, but even at the approach of death declared his full satisfaction with the work, such as it was. His later years were made very wretched by continued, or at least frequently recurring, hypochondria, under the influence of which he suffered from painful fantasies, which he was unable to control. His strength was completely worn out by these and other infirmities, and, prematurely old, he died in Paris at the early age of 39. His *Pensées sur la Religion, et sur quelques autres Sujets*, being unfinished, were published with suppressions and modifications 1669; but their full value was learned only from the complete ed. published at the instance of Victor Cousin (Paris 1844). As scattered fragments of thought on the vastest themes, the *Pensées* give an impression of vagueness, and raise more questions than they settle. While thus lacking the character of a satisfactorily complete discussion, they are in parts richly suggestive. Of all his works, the *Lettres Provinciales* have been most frequently reprinted. They were translated into Latin in the lifetime of P. by Nicole, under the pseudonym of a German prof., 'Wilhelm Wendroc;' and an ed. in four languages appeared at Cologne 1684.

PASCH, or PASCHE, n. *păsk* [L. and Gr. *Pascha*, the Passover, Easter: Heb. *Pesach*, the feast of the Passover —from *pâsach*, to pass over]: the feast of the Passover; Easter. PASCH EGG, a hard-boiled egg stained or painted, used variously by the young at Easter. *Note.*—EASTER is F. *pâque;* OF. *pasque:* we have prov. Eng. *pask*, and Scot. *pas* or *pase*, names for Easter. The hard dyed, variously colored eggs are in prov. Eng. *paste eggs*, and in Scot. *pase eggs*. The old name PASCH, for the native name EASTER, was and is so applied because Christ arose immediately after the Jewish Passover, on the first day of the week, the Christian Sunday: see EASTER.

PASCHAL, a. *păs'kăl* [Heb. *Pesach;* Gr. *Pascha,* the Passover—from Heb. *pâsach,* to pass over] : pertaining to the feast of the Passover (q.v.) or to Easter (q.v.). PASCHAL CONTROVERSY (see EASTER). PASCHAL CYCLE, that which fixes the time of Easter. PASCHAL FLOWER, or PASQUE FLOWER, purple flower, named from its flowering about Easter (see below). PASCHAL LAMB, among the *Jews,* the lamb slain and eaten at the Passover.

PAS'CHAL CHRONICLE; known also as *Alexandrinum,* from its supposed compiler, Peter of Alexandria, and as *Fasti Siculi* (from L. *fas,* with acquired meaning history, and *Siculi,* Sicily, whence a copy was brought): compilation of rules for Easter (AS. for Gr. and L. *Pascha,* Passover), and chronology of the world from Adam to A.D. 354, whence the date of the chronicle is inferred; author unknown. It was afterward extended to 620. A later addition was a list of Rom. emperors from Augustus to Constantius Monachus, 1042. It contains faulty but valuable chronological material. An edition with Gr. text and L. translation was edited by L. Dindorf of Bonn 1832.

PAS'CO, or (fully) CERRO DE PASCO, *sĕr'rō dā pâs'kō:* important mining city in Peru, dept. of Junin, about 14,000 ft. above sea-level; 80 m. n.e. of Lima in direct line, but more than 130 m. by the winding mountain road. It is a collection of huts spread over an area hollowed out and perforated in all directions by silver mines. There is a journal of literature and mining. The Cerro, or 'mountain knot,' of Pasco rises, in Sacshuanata, 16,000 ft. above sea-level. Coal is found. Pop. varies largely, according to the state of the mines; average about 13,000.

PAS-DE-CALAIS, *pâ-dėh-kâ-lā'* (Fr. for Strait of Dover): department in n. France, bounded n. by the dept. of Nord and the Strait of Dover, and w. by the Strait of Dover and the English Channel; 2,540 sq. m., of which 883,300 acres are cultivated, and 236,707 in meadows. The surface is level, except a ridge of hills running from s.e. to n.w., ending in Gris-Nez Cape (q.v.), and forming the watershed between the North Sea and the English Channel. The rivers are short; they are the Scarpe and Lys in the basin belonging to the North Sea, and the Authie and Canche in the basin belonging to the English Channel. The rivers are navigable within the dept., and are connected by canals. The coast-line is 80 m. in length, and the shores are in parts low and sandy; while for several miles on either side of Gris-Nez, cliffs similar to those of Dover front the sea. The climate is mild, but exceedingly inconstant. The soil is very fertile—all the usual cereal and leguminous crops are produced in abundance; and the country is very productive as regards both agriculture and manufactures. Fishing is actively carried on, particularly in the neighborhood of Boulogne. Coal of indifferent quality

is raised, the excellent quarries of the department are worked, and much turf is cut. The industrial establishments are numerous and important, e.g., iron foundries, glass-works, potteries, tanneries, and numerous bleach-works, and mills and factories of various kinds. Boulogne and Calais are the principal harbors. There are six arrondissements—Arras, Béthune, St. Omer, St. Pol, Boulogne, and Montreuil. The capital is Arras.—Pop. of P. (1891) 874,364; (1901) 955,391.

PĂSENG′: see GOAT.

PASEWALK, *pâ-zĕh-vâlk:* town of Prussia, govt. of Stettin, 25 m. w.n.w. of the city of Stettin, on the Uker. It contains two churches, two hospitals, and several woolen-cloth and leather factories; and carries on an active general trade. Pop. (1880) 9,469; (1890) 8,247.

PASH, v. *păsh* [Dan. *baske*, to slap: prov. Sw. *paska*, to dabble in water: an imitative word, as *dash* is]: in *OE.*, to dash; to bruise; to smash; to strike. PASH′ING, imp. PASHED, pp. *păsht. Note.*—The *rough pash* of Shakespeare is said to mean, a 'furrowed brow'—from Gael. *bathais*, the forehead, pronounced *băsh* or *păsh*—see Gael. Etymology. It is probable that *pash* is another form of *box*, and connected with *baste*—all being onomatopoetic in their origin—see Skeat.

PASHA, or PACHA, n. *pâ′shă* or *pă-shâ′* [Pers. *pasha*—from *pad*, powerful; *shah*, king: Ar. *basha*]: in the *Turkish empire*, the viceroy or governor of a province; title of honor of the chief ministers and officers, civil, and military or naval, of the sultan: the title was anciently given only to princes of the blood. The pashas were formerly distinguished in their rank by one, two, or three horsetails on a staff carried before them—the visible symbol is now discontinued. Pashas of the highest rank are pashas of three tails, and include, in general, the highest functionaries, civil and military: all pashas of this class have the title vizier. The pashas of two tails are the governors of provinces, generally called by the simple title 'pasha.' The lowest rank of P. is the P. of one tail; the sanjaks, or lowest class of provincial governors, are of this rank. The P. of a province has authority over the military force, the revenue, and the administration of justice. His authority was formerly absolute, but a check has been imposed on him by the appointment of local councils. The P. is in his own person the military leader and administrator of justice for the province under his charge, and holds office during the pleasure of the sultan—a most precarious tenure, as the sultan can at any moment, in the exercise of his despotic power, exile, imprison, or put him to death; and this has frequently been done in cases where the pasha's power has excited the apprehension, or his wealth the avarice, of his royal master. PASHALIC, n. *pă-shâl′ĭk*, the province or government of a pasha: ADJ. pertaining to a pasha.

PASIG, a river of the Philippines, the outlet of the Bay Lagoon into the Bay of Manila, at the city of Manila, length ten miles. It has several important tributaries, is navigable for native boats and light craft, and is the chief means of communication between Manila and the Bay Lagoon and the provinces on its shores.

PASIGRAPHY, n. *păs-ĭg'ră-fĭ* [Gr. *pas*, all; *graphō*, I write]: any system of universal writing; the imaginary universal language, to be spoken and written by all nations.

PASIPH'AË. See MINOS; MINOTAUR.

PASKEVITCH, *pâs-kĕh'vich*. IVAN FEODOROVITCH, Count of Erivan, Prince of Warsaw: Russian field-marshal: 1782, May 8—1856, Jan. 29; b. Poltava; of a Polish family. He was at first a page to Czar Paul, but entered the army, and served in the campaign in 1805, which was ended by the defeat of Austerlitz; and then against the Turks. He was prominent in the campaign of 1812, and several times defeated the French under Eugène, Ney, and St. Cyr; he was also present at Leipzig and in the conflicts under the walls of Paris. In 1825 he was appointed commander-in-chief against the Persians, whom he completely defeated, conquering Persian Armenia, taking Erivan, and ending the war by the peace of Turkmanshai (q.v.), a peace exceedingly favorable to Russia. In recompense for these services, he was created Count of Erivan, and received a grant of 1,000,000 rubles ($770,796). In 1828 and 1829 he made two campaigns against the Turks in Asia, signalized by the taking of Kars, Erzerum, and other important provinces, and terminated by the treaty of Adrianople 1829. In 1831 Paskevitch, now field-marshal, was appointed viceroy of Poland, put an end to the revolt within three months after his appointment, and reconstructed the administration on the basis of a complete incorporation with Russia. Such was the vigor and severity of his rule, that the eventful year 1848 passed without any attempt at revolution. When Russian intervention in Hungary had been resolved upon, Paskevitch, though now 67 years of age, marched into that country at the head of 200,000 men, and, after a junction with the Austrians, defeated the Hungarians in several battles, and by mere force of numbers crushed out the last spark of insurrection. The 50th anniversary of his military service was celebrated at Warsaw, 1850, with great rejoicings, and on this occasion the sovereigns of Austria and Prussia conferred on him the rank of field-marshal in their respective armies. In 1854 he unwillingly took the command of the Russian army on the Danube; but fortune, which had hitherto invariably smiled upon him, deserted him at Silistria; and after undergoing a succession of sanguinary repulses, and being himself grievously wounded, he withdrew his army, and, resigning the command, retired to Warsaw, where he fell into a profound melancholy, and died.

PASPALUM, *păs'pa-lŭm:* a genus of grasses, with spikes either solitary or variously grouped, one-flowered spikelets, and awnless paleæ. The species are numerous, natives of warm climates.—*P. scrobiculatum* is cultivated as a cereal in India, where it is called Koda. See MILLET. It will grow in very barren soils, and delights in a dry, loose soil. *P. exile* is cultivated in like manner in w. Africa, where it is called Fundi (q.v.) or Fundungi.—Other species are valuable as fodder-grasses. *P. purpureum* is a very important fodder-grass in the coast districts of Peru, during the dry months of Feb. and March. *P. stoloniferum*, also a Peruvian species, has been introduced into France; but is liable to be injured by frosts, and seldom ripens its seeds in the neighborhood of Paris.

PASQUE, n. *păsk* [OF. *pasque;* F. *pâque*, Easter]: feast of Easter: see PASCH.

Pasque Flower (*Anemone pulsatilla*).

PASQUE FLOW'ER, *păsk* (*Pulsatilla*): genus of plants of nat. order *Ranunculaceæ*, by many botanists still included in *Anemone*, the chief distinguishing characteristic being the long, feathery awns of the fruit. The species are perennial, silky, herbaceous plants, with doubly pinnatifid or doubly trifid leaves, and a simple one-flowered scape. They are narcotic, acrid, and poisonous. The Common P. (*Pulsatilla vulgaris* or *Anemone pulsatilla*) is a native of many parts of Europe. It has widely bell-shaped bluish-purple flowers. Another species, *P.* or *A. pratensis*, native of the continent of

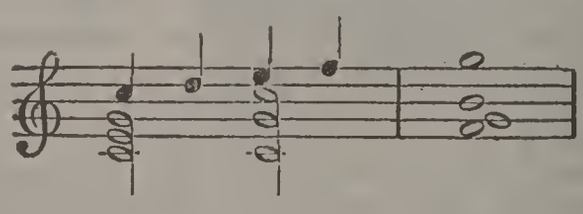
Europe, has smaller and more perfectly bell-shaped blackish-purple flowers.—These plants emit, when bruised, a pungent smell; and contain, as their principal constituent, a peculiar pungent essential oil, which, in combination with *Anemonic Acid*, forms an acrid and very inflammable substance called *Anemonine*, or *Pulsatilla Camphor*, and sometimes used in medicine. *Pulsatilla* is a favorite medicine of the homeopathists. *Easter Eggs* are colored purple in some places by the petals of the pasque flower.—More acrid than any of the species just named is *Pulsatilla patens*, which occasionally even blisters the skin.

PASQUIL, n. *păs'kwĭl:* same as PASQUINADE.

PASQUIN, n. *păs'kwĭn*, or PASQUINADE, n. *păs'kwĭnād:* lampoon or satire: V. to lampoon or satirize. PAS'QUINADING, imp. PAS'QUINADED, pp.—*Pasquinade* is an anonymous or pseudonymous publication of small size, sometimes printed, sometimes only posted up or circulated in manuscript, and having for its object the defamation of a character, or at least the turning of a person to ridicule. The name is derived from *Pasquino*, a tailor (some say a cobbler, others a barber) remarkable for wit and sarcastic humor, who lived in Rome toward the close of the 15th c., and attracted many to his shop by his sharp and lively sayings. Some time after his death, a mutilated fragment of an ancient statue, considered to represent Menelaus supporting the dead body of Patroclus, was dug up opposite his shop, and placed at the end of the Braschi Palace, near the Piazza Navoni. It was named after the defunct Pasquino, and thus the practice originated of affixing to it placards containing satires and jests relative to the affairs of the day—the pope and the cardinals being favorite victims of the invisible satirists. Until recent years it continued to be the only outlet which the Roman had for his opinions and feelings on public men and affairs. The following are specimens of the mordant style of the Pasquin statue. 'Great sums,' said the satirist one day, in an epigram addressed to Pope Paul III., 'were formerly given to poets for singing; how much will you give me, O Paul, to be silent?'—On the marriage of a young Roman called Cesare to a girl called Roma, the statue gave the following advice: 'Cave, Cæsar, ne tua Roma respublica fiat.' Next day, in another part of the town, the rival statue of Marforio, in the Capitol, bore the reply: 'Cæsar imperat;' to which Pasquin with exquisite malice retorted: 'Ergo coronabitur.'

PASS, n. *pâs* [It. *passare;* F. *passer*, to pass, to go over: Ger. *pass*, a passage: L. *passus*, a step or pace]: a narrow passage or entrance; permission or license; an order by which vagrants or paupers are sent to their native place; a free journey-ticket on a railway; a free admission to a place of amusement; a push or thrust in fencing; state or condition: a satisfactory examination gone through,

as by a pupil in a school, before an inspector; a university examination to which no honors are attached: V. to cause to move onward; to move or proceed from one place, state, etc., to another; to go; to utter or pronounce, as an opinion; to neglect or omit; to enact or be enacted; to go through the necessary stages and receive sanction, as a bill in parliament; to determine finally, as a judgment; to thrust, as in fencing; to undergo; to be at an end; to go beyond; to go through; to be generally received; to run or extend; to transfer or be transferred; to vanish; to circulate, as, to *pass* bad money; to admit or allow, as, to *pass* the accounts. PAS'SING, imp.: ADJ. departing; in *OE.*, supremely excellent; eminent. AD. surpassingly; exceedingly: N. the act of going past; the act of carrying through all the regular forms, as a bill through parliament. PASSED, pp. *pâst.* PASSER, n. *pâs'sẽr*, one who passes. PAS'SABLE, a. *-să-bl*, that may be passed; possible to be passed or travelled through or over; tolerable; allowable; capable of repetition or admission; current. PAS'SABLY, ad. *-blĭ*, tolerably; moderately. PASS'LESS, a. *-lĕs*, having no passage. PASSER-BY, one who goes by or near. PASSING BELL, bell tolled immediately at a person's death, at or near the moment of the soul's 'passing' from the body: its use in Rom. Cath. countries is to invite the hearers to join in the prayers ordered 'for the dying in their hour of agony,' and which the priest, with his attendants, recites in the death-chamber: see BELL. PASS BOOK, a small book in which credit purchases or credits are entered. PASS CHECK, a ticket of admission to a place of amusement, or for re-entrance. PASS KEY, a key which opens a series of locks, or commonly a latch-key. PASS NOTE, a certificate from an employer that the bearer has legally left his last employment. PASSING NOTE, in *music*, a grace-note; intervening note, or note of transition, used to assist the progression in passing from one chord to another, and not belonging to either chord, e.g., the notes D and F in the upper part of the subjoined example. PASSWORD, in *mil.*, a word used as a signal by



which a friend may be distinguished from a stranger, and allowed to pass. TO PASS AWAY, to die; to spend or waste. TO PASS BY OR OVER, to overlook; to disregard; to excuse or forgive. TO PASS INTO, to blend completely with. TO PASS ON OR UPON, to determine; to give or utter, as an opinion or a sentence. TO PASS OFF, to impose upon. TO PASS OFF OR AWAY, to be dispersed; to vanish. TO PASS ONE'S WORD, to promise; to pledge one's self. TO BRING TO PASS, to cause to happen; to accomplish. TO COME TO PASS, to occur; to happen. MOUNTAIN PASS, a defile or narrow glen cutting a moun-

ain chain. *Note.*—F. *passer* is referred to a mid. L. or factitious L. *passārĕ*—from *passum*, the supine of *pandĕrĕ*, to open, as in *pandĕrĕ viam*, to make a way or passage—see Brachet.—SYN. of 'pass, v.': to run; be lost; move; spend; live through; be over; die; be effected; exist; occur; thrust; strain; percolate; pronounce; vent; transmit; omit; neglect; transgress; transcend; send; in *OE.*, to heed or regard; admit; allow;—of 'pass, n.': avenue; strait; passage; road; order; condition; push; thrust.

PASS: v. in *OE.*, for SURPASS.

PASSADE, n. *păs-sād′*, or PASSADO, n. *păs-sā′dō* [F. *passade*, a passing—from It. *passata;* Sp. *pasada*, a passage, a place]: in *fencing*, a thrust; the course of a horse backward and forward on the same spot of ground.

PASSAGE, n. *păs′sāj* [F. *passage*, a passage, a road—from *passer*, to pass—from L. *passus*, a step (see PASS)]: act of passing; a journey; a voyage; time occupied in passing; a way or road; entrance or exit; a corridor in a house or building; an event; an incident; an indefinite part of a book, writing, or discourse; in *music*, a portion of an air or tune; in *OE.*, state of decay. BIRD OF PASSAGE, a bird that passes at certain seasons from one climate or country to another (see BIRDS OF PASSAGE); person who is apt by force of circumstances, or by natural disposition, to change his place of abode frequently; a Bohemian; a wanderer. PASSAGE MONEY, the fare paid for conveyance by sea.—SYN. of 'passage': travel; course; road; entrance; exit; occurrence; hap; transaction; management; vestibule.

PAS′SAGE, WEST: seaport town on the western shore of the estuary of the river Lee, in county Cork, Ireland, which has risen into importance chiefly as a watering-place, and as the shipping-port and marine suburb of the city of Cork, about 6 m. distant, by the Cork and Passage railway. As the river above P. is not navigable for ships above 400 or 500 tons burden, ships of higher tonnage discharge their cargoes here. It is also a ship-building station. About four-fifths of the people are Rom. Catholics; the rest mainly are Prot. Episcopalians. Pop. about 3,000.—There is another small town, EAST PASSAGE, near the mouth of the Suir, in county Waterford, Ireland.

PAS′SAGE ISL′AND, called also CULEBRA: West Indian island of the Virgin or Passage group, belonging to Spain; lat. 18° 13′ n., long. 65° 17′ w.; seven m. long. It has lost great part of its original forest covering, and has a stunted vegetation. Pop. about 300.—PASSAGE ISLAND is the name also of a low-lying islet off the w. coast of Sumatra, 2° 24′ 30″ n. lat.—A small group between Celebes and Sangir is called Passage Islands.—Yet another Passage Island lies on the s. coast of Borneo

PASSAGLIA, *pâs-sâl'yâ*, CARLO: Roman Catholic theologian, famous in connection with the movement for the unity of Italy; born Lucca, 1812, May 2, d. 1887, March 17. While very young, he entered the Jesuit Soc., and soon obtained great distinction in its schools. Appointed professor of theology in the Roman College, he was eminent alike for learning and for eloquence. During the troublous times of 1849-51 he taught in a Jesuit college in England; but on the re-establishment of the Jesuits in the Roman College, he resumed possession of his chair. During the discussions which preceded the definition of the doctrine of the Immaculate Conception of the blessed Virgin Mary (q.v.), Passaglia produced an elaborate treatise on the doctrine and history of that question, published at the cost of the Roman govt. Soon afterward, however, the dissatisfaction expressed at the unsuitable character and method of his lectures, by the authorities of the order, led to his resignation of the professorship of theology. Still, however, he continued a member of the Soc.; and the pope, who felt a friendship for him, established in the Roman Univ. a special chair of philosophy for Passaglia, which he did not long retain. In 1858 or 1859 he left the Soc. of the Jesuits, and entered warmly into the discussions as to the temporal power of the pope, in connection with which he undertook a voluntary but fruitless mission to Turin. Having fallen under suspicion in Rome, and his house having been invaded by a domiciliary visit of the police, he withdrew to Turin, where he established a journal, *Il Mediatore*, which appeared till 1866. He was appointed by the king prof. of moral philosophy, and subsequently of theol. in the Univ. of Turin. In 1863 he became a member of the Turin parliament, but his success fell far short of his reputation. He is said to have sought reconciliation with the church, but to have failed to make the required retraction.

Passaglia's principal works are the treatise on the Immaculate Conception (4 vols. 4to); a treatise (Latin) on the Primacy of St. Peter (8vo, 1850); a scholastic treatise entitled *Commentarius Theologicus de Partitione Divinæ Voluntatis* (8vo, Rome 1851); an apology for the cause of Italian unity, *Pro Causa Italica ad Episcopos Catholicos* (Florence 1861), in which he recommends the church to make peace with the nation; several essays on religious and political subjects, and recently a learned and very detailed Reply to Renan's *Vie de Jésus* (Italian).

PASSAIC, *păs-sā'ĭk:* N. J., city in Passaic county; on the Passaic river, and on the New York, S. & W., the Erie, and the Delaware, L. & W. R.Rs.; about ten miles northwest of New York city. It was settled in 1692, and until 1852 was called Aquackenonk Landing. It was incorporated as a village in 1869, and in 1873 was chartered as a city. It is near the scene of several

of the engagements of the Revolutionary war; Washington crossed the Passaic river at Aquackenonk Landing, in 1776, when he was retreating through New Jersey. Passaic is a manufacturing city, the good water-power is utilized in developing several industries. The chief industrial establishments are large rubber works, silk mills, enameline factories, woolen mills, handkerchief factories, chemical works, and wineries. The prominent public buildings are the churches, schools, libraries, and municipal buildings. The park surrounding the city-hall, the water system, the beauty of its residential section, flagged sidewalks, good roads, all indicate healthy progress. The educational institutions are the Collegiate School, the public and parish schools, the city library, and the Jane Watson Reid Memorial Library. The government is administered under a revised charter of 1874 and is vested in a mayor, who holds office two years, and a council. The school board is chosen by popular vote. Pop. (1910) 54,773.

PASSAIC: a river of New Jersey, which has its source near Morristown, in Morris county, flows first south, then east on the line between Morris and Somerset counties, then northeast between Morris and Essex counties, crosses a corner of Passaic county, and flows south into Newark Bay. It is about 100 miles long and navigable for small vessels as far as Passaic. At Paterson there is a fall of 72 feet, about 50 feet of perpendicular descent. The extensive water-power has been utilized for manufacturing, and by means of dams and canals has been distributed to many manufactories.

PASSAMAQUOD'DIES (Indians): an American tribe of the Algonquin family, formerly residing in the vicinity of Passamaquoddy Bay and the Saint Croix River in Maine and in New Brunswick. They are closely related to the Amalecite and more distantly to the Abnaki proper, but in their customs resemble the latter. During the period of the colonial wars the tribe fought with the French. About 200 of them now remain, residing on Lewis Island. See PENOBSCOTS.

PASSAMAQUODDY BAY, *păs-a-ma-kwŏd'ĭ:* inlet opening out of the Bay of Fundy, between Maine and New Brunswick; twelve miles long, six wide, shut in by a cluster of islands and forming an excellent harbor. It receives the St. Croix, Didgeguash, and other rivers, and forms the harbor of the flourishing town of Eastport, Me. The bay abounds in fish, and has tides of 25 ft.

PASSANT, n. *păs'sănt* [F. *passant*, a passer-by: L. *passus*, a step]: heraldic term used to express the attitude of an animal in a position of leisurely walking, with his head straight before him. EN PASSANT, ad. *ăng păs-săng'* [F.]: in passing; by the way.

PASSAREE, n. *păs-sa-rē′* [etym. doubtful]: in *naut.*, a tackle to spread the clews of a foresail when sailing large or before the wind.

PASSAROWITZ, *pâs-sâ′rō-vĭts*, or POSHAREWATZ (Servian *Pozarevaz*): town in the principality of Servia, 5 m. s. of the Danube. Its streets are wide and unpaved; its houses detached, and surrounded with palisades. The town is noteworthy chiefly for the treaty signed here by Prince Eugene and the grand vizier 1718, July 21. By this treaty—which put an end to the war undertaken by the Turks against Venice 1714, for conquest of the Morea—a truce of 25 years was established, and the Banat of Temesvar, the w. portion of Walachia and Servia, the town and territory of Belgrade, and a part of Bosnia, were secured to the House of Austria.—Pop. of P. (1901) 12,957.

PASSAU, *pâs′sow:* ancient, picturesque frontier town of Bavaria, at confluence of the Inn and the Ilz with the Danube, 90 m. e.n.e. of Munich. It consists of P. proper (triangular in shape, occupying an eminence on the tongue of land between the right bank of the Danube and the left bank of the Inn), and the suburbs, Innstadt, on the right bank of the Inn; Anger and Fort Oberhaus, between the Danube and the Ilz; and Ilzstadt, on the left bank of the Ilz. At the point of junction, the Inn is both wider (834 ft.) than the Danube (696 ft.), and has had a longer course. The railway bridge, and another iron bridge on eight piers of granite, connect Innstadt with P., and the Danube is crossed by a fine bridge on seven piers, also of granite. Fort Oberhaus, on the left bank of the Danube, stands on steep, wooded cliffs more than 400 ft. high, and is connected with the castle of Niederhaus by old walls; both are now used as prisons for criminals from the upper classes, and military offenders. The appearance of P., at the confluence of two great rivers, and rising like an amphitheatre on the most beautiful spot of the Danube, is strikingly effective and picturesque. Among the chief buildings are the cathedral; the bishop's palace; the post-office, where the treaty of P. was signed 1552; the Jesuits' College, a large building now used as a school; and the Church of St. Michael. In the Cathedral square (Domplatz) is a bronze statue of King Maximilian Joseph, erected 1828. P. contains also numerous picture-galleries, collections of antiquities, and benevolent and charitable institutions. The women of P. are noted for beauty.

The natural advantages of this site, in a military point of view, were appreciated at an early period by the Romans, who erected a strong camp here, garrisoned it with Batavian troops, and from this circumstance named it *Batava Castra*. P. was long the seat of an independent bishopric founded in the 7th c., but secularized 1803. By the treaty of P., signed here 1552 by Emperor Charles V. on the one side, and the Prot. princes of

Germany on the other, public recognition of the Lutheran faith among the institutions of the empire was granted. The cathedral of P. and great part of the town were consumed by fire 1662.—Pop. (1875) 14,752; (1880) 15,365; (1890) 16,633; (1901) 17,988.

PASSÉ, a. *păs'sā* [F. *passé*—from *passer*, to pass (see PASS)]: past; out of use; faded; worn. PASSE PARTOUT, *păs' pâr-tô'* [F. *passer*, to pass; *partout*, everywhere]: that by which one can pass anywhere; a master-key; an engraving on wood or metal of an ornamental border, the centre of which was cut out to allow another engraving to be inserted, to which the first formed a kind of frame; a light picture-frame of cardboard, having the inner edges generally gilt.

PASSECAILLE, *pâs-kāy'*, AND PASSEPIED, *pâs-pyā'*: two old French dances, the music of the former being in $\frac{3}{4}$, the latter in $\frac{3}{8}$, time. Compositions under these names, suggestive of the dances, though not meant for dancing, occur among the 'Suites,' or collections of short pieces for the harpsichord or clavichord, by Sebastian Bach and Handel.

PASSENGER, n. *păs'sĕn-jėr* [F. *passager;* Sp. *pasajero*, a traveller, a passenger (see PASSAGE and PASS)]: a traveller; a wayfarer; one journeying by railway, steamboat, or coach (see TRAVELLERS, LAW AS TO: CARRIERS). PASSENGER SHIP, a steamer or sailing-vessel having accommodation for passengers by sea; an emigrant ship. *Note.*—The *n* in PASSENGER is intrusive, the oldest English being *passager*.

PAS'SENGER PIG'EON (*Ectopistes migratorius*): species of pigeon, native of N. America, interesting from the marvellous numbers of which its flocks are often composed. The genus to which it belongs has, like the turtle-doves, a bill more slender than the ordinary pigeons, notched, and with a tumid fleshy covering above, at the base; the head is small in proportion to the body, the legs are short and strong, the feet naked, the tail is either rounded or wedge-shaped, the wings are long and pointed. The P. P., generally known in N. America as the Wild Pigeon, has a long wedge-shaped tail; the whole length 15 to 17 inches, of which the tail occupies nearly one-half. It is a beautiful bird, of very graceful form and finely colored plumage. The plumage of the female is duller than that of the male.—The P. P. is found in almost all parts of N. America, from the Gulf of Mexico to the Arctic regions. It is not, properly speaking, a bird of passage; its migrations being apparently consequent altogether on the failure of supplies of food in one locality, and not connected with the breeding-season or the season of the year. Its power of flight is very great, and it is supposed to be able to sustain a long flight at the rate of 60 m. an hour. Passenger pigeons have been killed in the neighborhood of New York with their crops full of rice, which they must have collected in the fields of Carolina or Georgia not

many hours before. It is not, therefore, surprising that wanderers of this species should occasionally appear in Britain and in other regions far from their native abode. The nest of the P. P. in the American forests consists usually of a few dry twigs placed in a fork of the branches of a tree, and containing two eggs, sometimes only one egg. They breed two or three times in a season. In the backwoods, where vast numbers of pigeons build in one breeding-place, many nests, sometimes 100 or more, are often seen in one tree. These great breeding-places extend over a vast tract of forest, sometimes 40 m. in length; but in the more cultivated parts of the United States the P. P. builds singly and not in communities. The numbers of birds forming the communities of the western forests surpass calculation. Flocks of them are seen flying at great height in dense columns,

Passenger Pigeon (*Ectopistes migratorius*).

eight or ten m. long; and there is reason to suppose, from the rapidity of their flight, and the number of hours taken by a column in passing a particular spot, that in some of their great migrations the column, a mile broad, is more than 150 m. long. Their roosting-places, as well as their breeding-places, are of prodigious magnitude. The graphic descriptions of Wilson and Audubon are too long to be quoted; but there is perhaps nothing of the kind so wonderful in relation to any species of bird. The noise of wings and of cooing voices is as loud as thunder, and is heard at the distance of miles. It drowns the report of guns. The multitudes which settle on trees break down great branches by their weight, so that it is dangerous to pass beneath. They crowd together, alighting one upon another, till they form solid masses like hogsheads, and

great numbers are killed when the branches break. The inhabitants of the neighboring country assemble, shoot them, knock them down with poles, stifle them by means of pots of burning sulphur, cut down trees to bring them in great numbers to the ground, eat them, salt them, and bring their hogs to fatten on them. Wolves, foxes, lynxes, cougars, bears, raccoons, opossums, polecats, eagles, hawks, and vultures all congregate to share the spoil. The flesh of the P. P. is of dark color, but moderately good for food; that of young birds is much esteemed. The nestlings are in general extremely fat, and are sometimes melted down for their fat alone. The food of the P. P. consists chiefly of beech-mast and acorns; but it readily eats almost any kind of nut, berry, or seed.

PASSERINE, a. *păs'sėr-ĭn* or *-īn* [L. *passer*, a sparrow]: pertaining to birds of the sparrow kind. PASSERES, n. plu. *păs'sėr-ēz*, or PAS'SERINES, n. plu. *-īnz*, order of birds to which the sparrows belong: see INSESSORES.

PASSIBLE, a. *păs'sĭ-bl* [F. *passible*; It. *passibile*, able to suffer—from L. *passibĭlis*—from *passus*, suffered]: capable of feeling; susceptible of impressions from external agents. PAS'SIBLENESS, n. *-nĕs*, or PAS'SIBIL'ITY, n. *-bĭl'ĭ-tĭ*, aptness to feel or suffer; susceptibility of impressions from external agents.

PASSIFLORA, n. *păs'sĭ-flō'rā* [L. *passus*, suffered; *flos* or *flōrem*, a flower]: the genus of plants which includes the passion flower: see PASSION FLOWER.

PASSING, a.: supreme: see under PASS.

PASSION, n. *păsh'ŭn* [F. *passion*, passion—from L. *passĭōnem*—from *passus*, borne or suffered: Gr. *pathos*, suffering: Skr. *bâdh*, to make to suffer: It. *passione*]: violent excitement and agitation of mind in anger; anger; love; eager or vehement desire. THE PASSION, the sufferings of Christ Jesus between the Last Supper and his death. PAS'SIONS, n. plu. *-ŭnz*, those desires or workings of the mind that generally seek relief or gratification, such as anger, fear, love, joy, ambition, avarice, revenge, etc. PASSIONED, a. *păsh'ŭnd*, in *OE.*, disordered; expressing passion; violently affected. PAS'SIONLESS, a. *-lĕs*, of a calm temper; not easily excited to anger. PAS'SIONATE, a. *-ŭn-āt* [mid. L. *passĭonātŭs*]: easily excited or moved to anger; feeling or expressing strong emotion; arising from passion. PAS'SIONATELY, ad. *-lĭ*. PAS'SIONATENESS, n. *-nĕs*, the state of being passionate; vehemence of mind. PASSION CROSS, cross of the form on which the Lord Jesus suffered; having a long stem and a short traverse near the top. It is of occasional occurrence as a heraldic charge, though less frequent than many other varieties of cross. A passion cross, elevated on three steps or degrees (said by heralds to represent the

Passion Cross.

virtues of Faith, Hope, and Charity), is called a Cross Calvary. PASSION FLOWER, a flower so named from a fancied resemblance to the instruments of the Lord's crucifixion, and various attendant manifestations; popular name for the genus *Passiflōra*, ord. *Passiflorāceæ* (see below). PASSION-TIDE (see PASSION WEEK, below). PASSION WEEK, name frequently given in England and the United States to the week immediately preceding Easter, and otherwise called HOLY WEEK (q.v.). But by the proper rubrical usage, Passion Week is that which precedes Holy Week, and is the second week before Easter, commencing on PASSION SUNDAY, the fifth Sunday in Lent. In the Roman calendar, the whole of the last fortnight of Lent is known by the name Passion-tide, and all the services of that time differ in many respects from those, not alone of the year, but even of the rest of Lent. The verse *Gloria Patri* is discontinued both in the mass and in the Breviary, and all pictures, crucifixes, statues, and other sacred representations are veiled during the whole of Passion-tide. PASSION PLAYS (see MYSTERIES AND MIRACLE-PLAYS).—SYN. of 'passion': zeal; love; anger; ardor; eagerness; feeling; emotion.

PAS'SION FLOW'ER (*Passiflora*): genus of plants, natives almost exclusively of warm parts of America, and belonging to the nat. order *Passifloraceæ*, which is an order of exogenous plants, of which more than 200 species are known, mostly climbers, having tendrils which spring from the axils of the leaves, herbaceous or half-shrubby, natives of tropical and sub-tropical countries, but rare in Asia and Africa. The leaves of the *Passifloraceæ* are alternate, simple, and variously lobed. The flowers are generally hermaphrodite, with a colored calyx, generally of five segments; the segments of the corolla equal in number to those of the calyx or absent, and several rows of filamentous processes springing from within the cup, which is formed by the consolidated calyx and corolla; the stamens, generally five, and generally united by their filaments, inserted at the base of the tube of the calyx; the ovary free, generally elevated on a long stalk, one-celled; three thick styles with dilated stigmas; ovules numerous. The fruit is either fleshy or capsular. In the passion flowers it is fleshy. This genus received its name from fanciful persons among the first Spanish settlers in America, imagining that they saw in its flowers a representation of Christ's passion; the filamentous processes being taken to represent the crown of thorns, the nail-shaped styles the nails of the cross, and the five anthers the marks of the wounds. The species are mostly half-shrubby evergreen climbers, of rapid growth; and most of them have lobed leaves, with from two to seven lobes. The flowers of many are large and beautiful, on which account they are often cultivated in hothouses. Some of the species also are cultivated in tropical countries for their fruit, par-

ticularly those of which the fruit is known by the name Granadilla (q.v.). The fruit of *P. edulis* also is somewhat acid and of pleasant flavor, and ices flavored with it are delicious. Its fruit is about two inches long, and an inch and a half in diameter, of livid purple color, with orange pulp.—The fruit of some species of P., however, is not only uneatable, but fetid; and the roots, leaves, and flowers of some, as well as of other *Passifloraceæ*, have medicinal properties, narcotic, emmenagogue, anthelmintic, febrifugal, etc. *P. rubra* is called Dutchman's Laudanum in Jamaica, because a tincture of the flowers is used as a substitute for laudanum. The most hardy species of P. is the BLUE P. (*P. cœrulea*), which thrives in parts of France, and even in s. England. Where the climate is suitable, passion flowers form an admirable covering for arbors and trellises.

Passion Flower (*Passiflora cœrulea*).

PAS'SIONISTS: religious congregation of priests of the Rom. Cath. Church, the object of whose institute, indicated by their name, is to preach 'Jesus Christ, and him crucified.' The founder, Paul Francis, surnamed Paul of the Cross (1694–1775), was b. at Ovada, diocese of Acqui, kingdom of Sardinia. Having commenced his career as a hermit, he formed the design of enlisting others in the missionary life; and being ordained priest 1737, he associated himself with ten others, and obtained for his plan the approbation of successive popes, together with the convent on the Celian Hill, at Rome, still the mother-house of the congregation. The special object of the institute was to instil into men's minds by preaching, by example, and by devotional practices, a sense of the mercy and love of God as manifested in the

passion of his Son. Hence the cross appears everywhere as their emblem, in their churches, in their halls, and in the courts and public places of their monasteries. A large crucifix, moreover, forms part of their very striking costume. They go barefooted, and practice many other personal austerities, rising at midnight to recite the canonical hours in the church; and their ministerial work consists chiefly in holding what are called 'missions,' wherever they are invited by the local clergy, in which sermons on the passion of Christ, on sin, and on repentence, together with the hearing of confessions, hold the principal places. For a time, Paul's congregation remained in obscurity; but it has risen into notice within the last half-century, new houses having been founded in England, Ireland, Belgium, America, and Australia.

PASSION MUSIC: the musical rendering of certain portions of the Catholic church's liturgy in the week preceding Easter, now called, but improperly, by non-Catholics, Passion week, its proper name being both in the Latin and the Eastern church Holy week—*Hebdomas* (or *Septimana*) *sancta, major*, etc., and ἑβδὸ μᾶς ἁγία, μεγάλη, etc. In the calendar of the Latin Church, Passion week is the week which begins with Passion Sunday (*Dominica Passionis*), the fifth Sunday of Lent: the sixth Sunday is Palm Sunday (*Dominica in Palmis*, ἑορτή τῶν βαΐων) in the Latin and Greek churches. On that day the history of our Lord's Passion, as recounted in the Gospel of Matthew, is chanted alternately by three clerks in holy orders, one rendering the narrative portion (*evangelista*), another the words spoken by Jesus (*Christus*), the third those spoken by the apostles, the high priests, etc. In the afternoon or evening of the Wednesday, Thursday and Friday of Holy Week the office of Matins and Lauds is chanted, the most striking feature of the musical service being the rendering, on Holy Thursday and Good Friday, of the Lamentations of the Prophet Jeremiah in most exquisitely appropriate plain-chant melodies; this service is called *Tenebræ* because by gradual extinguishment of all the lights the interior of the church is left in darkness. In the morning service of Holy Thursday (Maundy Thursday) is chanted the noble hymn of triumph,

> Pange, lingua, gloriosi corporis mysterium,
> Sanguinisque pretiosi quem in mundi pretium
> Fructus ventris generosi Rex effudit gentium.

On Good Friday, in the morning service, the history of the Passion according to Saint John is chanted. Deeply impressive, in the service of this day, is the dramatic rendering of the *Improperia* or 'reproaches' of Jesus to the Jewish people, while the clergy and people are doing reverence to the representation of the Crucified: *'Populc meus, quid feci tibi? aut in quo con-*

tristavi te,' etc.—'My people, what have I done to thee or wherein have I vexed thee?' and this trophe of one chanter is taken up by a second with: *'Quia eduxi te de terra Ægypti parasti crucem salvatori tuo.'* After each *improperium* one choir chants, in the Greek language, 'Holy God,' to which a second choir responds 'Holy God' in Latin: then alternately in Greek and Latin the two choirs chant 'Holy Strong,' 'Holy Immortal, have mercy on us.' In the morning service of Holy Saturday the grand prose composition, *Exultet*, is sung to the finest melody in the whole repertoire of church music.

PASSION PLAY, See MYSTERIES AND MIRACLE PLAYS.

PASSIONS, in psychology: those violent forms of emotion which result in the loss of self-control and rational balance. The word has here lost its original passion significance and expresses rather the active fact that there is a violent mental attitude which grows out of suffering which attitude in turn develops the tendency to react upon the source of the suffering without restraint. From this derived meaning it is a short step to those unrestrained forms of feeling and action which have no original element of suffering such as the passion of love or the unlimited devotion of the artist to his art. Thus we speak of a passion for beauty or music, or a corrupt carnal passion. In the latter sense the word becomes a synonym for lust.

PASSIVE, a. *păs'sĭv* [F. *passif*, passive—from L. *pas sīvus*—from L. *passus*, suffered: It. *passivo*]: not opposing or resisting; suffering without resistance; submissive; denoting that form of a verb in which the object of the active voice becomes the subject. PAS'SIVELY, ad. *-lĭ*, in a passive manner; without agency or resistance. PAS'SIVENESS, n. *-nĕs*, the quality of being passive, or of receiving impressions from external agents. PASSIVITY, n. *păs-sĭv'ĭ-tĭ*, the tendency of a body to preserve its state of either motion or rest. PASSIVE OBEDIENCE, absolute obedience of subjects to a sovereign. PASSIVE RESISTANCE, refusing to do or pay what the law requires, and taking the consequences. PASSIVE TITLE, in *the law of Scotland*, liability of an heir, or one who represents and interferes with the estate of a deceased person, to pay all the debts of the deceased. The doctrine of holding an heir universally liable has latterly been much restricted.—SYN. of 'passive': inert; inactive; unresisting; enduring; patient; quiescent; suffering; yielding.

PASSOVER, n. *pâs'ō-vėr* [Eng. *pass*, and *over*]: the great annual festival of the Jews, commemorative of their deliverance out of Egypt, when the destroying angel *passed over* their houses and entered those of the Egyptians: the sacrifice offered at the feast. PASSOVER BREAD OR CAKE, unleavened cakes used by the Jews at the festival of the Passover.—The *Passover* (*Pesach*,

Pascha) is the first and greatest of the three annual feasts of Israel (*Regalim*) instituted by Moses, at which it was incumbent on every male Israelite to make a pilgrimage to the house of Jehovah. It was celebrated on the anniversary of the Exodus from Egypt—i. e., on the 14th day of Nisan, otherwise called Abib, the period of the first full moon in the spring—and lasted eight days. In commemoration of the incidents connected with the great event of the liberation of the people, it was ordained that unleavened bread only should be eaten during this festive period, whence it bore the name also *Chag hamazzoth* (Feast of Unleavened Bread); and, further that a lamb one year old, and free from blemish, roasted whole, together with bitter herbs, should form the meal in every house on the eve of the feast. Prayers and thanksgivings, all with reference to the marvelous redemption from Egyptian bondage, accompanied the repast, at which the members of the family or families who had joined in the purchase of the lamb had to appear in traveling garb, in memorial of the journey of Israel forth from Egypt. At a later period, a certain number of cups of red wine were superadded to this meal, to which, as its special ceremonies and the order of its benedictions were fixed, the name *Seder* (arrangement) was given. The name passover was more strictly limited to the first day, in which the paschal lamb was entirely consumed, the reserving of any part of it to the next day being expressly forbidden (Ex. xii. 10); and the name Feast of Unleavened Bread belonged rather to the remaining days, on which other animal food was eaten; though the names were often used indiscriminately.

The paschal meal, as at present celebrated among the Jews, has more the character of a hallowed family-feast, with reference, however, to the great national event. The greater part of the Hebrews who live out of the Holy Land celebrate it on the first two evenings, as, owing to the uncertainty prevalent at one time with respect to the fixing of the new moon by the Sanhedrin at Jerusalem, it was ordained that the 'Exiles' should celebrate all their festivals—except the Day of Atonement—on two successive days, a law still in force among the orthodox. The regulations of the 'lamb for each house,' the traveling garb, etc., are abrogated, but many further symbolical tokens have been superadded; reminiscences both of the liberation from Egypt, and of the subsequent downfall of the sanctuary and empire. The order of prayers and songs to be recited on these evenings also has received many additions, and even mediæval German songs have crept in, as supposed to contain a symbolical reference to the ultimate fate of Israel. See HAGGADA (*shel Pesach*); FESTIVALS; EASTER; LORD'S SUPPER.

PASSOW, *pâs'so*, Franz Ludwig Karl Friedrich: philologist: 1786, Sep. 20—1833, Mar. 11; b. Ludwigslust, Germany. He studied at Gotha and Leipzig, giving special attention to philology and theology; was prof. of Greek at Weimar 1807–10, for the next 4 years was director at Jenkau, and was appointed prof. of ancient literature in the univ. at Breslau 1815. In addition to the texts and translations of various works, he published a valuable Greek-German lexicon, which passed through 4 editions in a few years. He died at Breslau.

PASSPORT, n. *pâs'pōrt* [F. *passeport*, a passport—originally, permission to leave or enter a port—from *passer*, to pass; *port*, a harbor: It. *passaporto*—from *passare*, to pass; *porto*, a harbor]: written warrant of protection and permission to travel, granted by the proper authority, to persons moving from place to place. Every independent state has right to exclude whom it pleases from its territory, and may require that all strangers entering it be furnished with properly authenticated documents, showing who they are, and for what purpose they are visiting the country. Passports are issued sometimes by the ministers and consuls of the country which the traveller intends to visit, which cannot, however, be done without the consent or connivance of the state of which the holder of the instrument is a subject; they properly proceed from the authorities of the state to which the traveller belongs, and ought to bear the *visa* or countersignature of the minister or consul of the country which he is about to visit. In some European states no one is allowed to go abroad without a P. from his govt. authorizing him to leave the country—a provision used as a means of detaining persons charged with crime; and passports are even required of the natives to enable them to go from place to place in their own country. The regulations of different states have varied much regarding the use of passports; and of late years there has been great relaxation of the stringency of the regulations connected with them. Since the facilities of travelling have so greatly increased, it seems to have become the prevalent opinion that the P. system tends to obstruct the free intercourse desirable between citizens of different countries; while it is ineffectual to prevent the entrance of dangerous or suspicious characters, who can obtain passports on false pretenses, or make their way in without them. Within the United Kingdom of Great Britain and Ireland, no passports are required, since the old law demanding them is not enforced; but for a British subject travelling in some parts of the continent they are still requisite. Formerly, the greater number of British subjects travelling abroad used to be furnished with passports from the ministers or consuls of the countries which they purposed to visit; the lord provost of Edinburgh was also in the way of issuing passports to Scotchmen. Of late years the P. most used by British subjects is that of the British sec. of state for foreign affairs, which is now granted to

any British subject for a fee of two shillings, and is good for life. Where the P. system is in full force, it is required that the P. be countersigned by the minister or consul of the country which the holder means to visit, this visa being of force for only a year. The French govt. allows foreigners to enter and leave France, and travel in it, without passports; but passports have sometimes been asked for when France is entered from the s. and e. In Belgium, Holland, Germany, Switzerland, Austria, Italy, Denmark, Norway, and Sweden, passports are no longer required. For Greece and Portugal they are necessary, and the visa is insisted on in Russia, Turkey, and Egypt. A foreigner travelling in countries where passports are not *de rigueur* will often find it a great advantage to have one as evidence of his identity and nationality. Till lately, throughout the greater part of Europe, a traveller was liable to be called on to produce his P., not only at every frontier town, but at every garrison town through which he passed. In several of the countries where passports are not required of travellers, they are of decided advantage, if not a necessity, to those who propose to settle there for some time—e.g., in Germany, especially since the anti-socialist legislation. In the United States there is no requirement of passports for ordinary travellers.

In time of war, passports or safe-conducts are granted by the supreme authority on the spot—i.e., the officer in command—to insure safety to the holders when passing from spot to spot, or while in the performance of some act specified in and permitted by the P. Passports may be granted for goods as well as individuals; and, in time of war, the P. of a ship is the formal voucher of its neutral character. It purports to be a requisition on the part of the govt. of a state to allow the vessel to pass freely with her company, passengers, goods, and merchandise, without hindrance, seizure, or molestation, as being owned by citizens or subjects of such state.

PASSY, *pâs-sē′:* town of France, dept. of Seine, a suburb of Paris, and included within its fortifications: see PARIS.

PASSYMEASURE, n. *păs′sĭ-mĕzh′ŭr* [a corruption of It. *passamezzo*—from *passo*, a step or pace; *mezzo*, middle]: an old stately dance; a cinque-measure [F. *cinque*, five]—that is, a dance of five measures.

PAST, a. *pâst* [L. *passus*, a pace or step: Eng. *pass*, which see]: gone by or beyond; not present nor future; ended; accomplished: PREP. beyond; out of reach of: AD. by, as, the wind swept *past*. THE PAST, time gone by. PAST MASTER, one who has been the master of a civic company or corporation; one who has filled the chair of a Freemason's lodge.

PASTA, *pâs'tâ*, GIUDITTA (JUDITH): one of the most distinguished opera-singers of modern times: 1798–1865; b. near Milan, Italy. She received her musical education partly at Como, under the chapel-master of the cathedral there, and partly in the conservatoire at Milan. After 1811 she appeared at various theatres of the second rank in n. Italy, and obtained a respectable success, but did not give indication of more than average ability. Her first great triumph was at Verona 1822. The year following she was engaged at the Paris Italian Opera, where her singing excited great admiration. From this moment she labored incessantly to reach the ideal perfection. 1825–30 was the period of her most splendid triumphs, won principally in London and Paris. Vienna, where she accepted an engagement 1832, witnessed the last. Some time afterward she withdrew from the stage, and purchased a villa on the banks of Lake Como, where, and at Milan, she resided till she died. P. in her best days had a magnificent voice, which easily passed from clear, shrill soprano notes to the gravest contralto tones. In addition she had fine dramatic energy and stateliness of manner, that suited lofty and imposing characters. Her principal rôles were *Medea*, *Desdemona*, *Semiramide*, *La Sonnambula* (the opera of this name was written for her by Bellini), and *Giulia* in *Romeo e Giulia*.

PASTE, n. *pāst* [It. *pasta;* OF. *paste*, paste, dough: Sp. *pasta*, paste: F. *pâte*, paste—from mid. L. *pasta*, paste: Gr. *pâstē*, a mess of food]: any semi-solid tenacious mixture: dough prepared for pies, etc.: any soft, sticky composition, as boiled flour and water, used as a glue or cement (see below): imitations of precious stones by means of a bright, heavy glass tinted with metallic oxides (see GEMS, IMITATION): V. to cement or fasten with paste. PAST'ING, imp. PAST'ED, pp. PASTY, a. *pās'tĭ* [OF. *pasté;* F. *pâté*, a pie, a pasty]: resembling paste: N. a crust-pie raised without a dish. PASTEBOARD, very thick, stiff paper; a stiff material made of sheets of paper pasted together.

PASTE: term denoting various compositions in which there is sufficient moisture to soften without liquefying the mass.

Common or adhesive P. is made by mixing wheaten flour with cold water in the proportion of about 2 lbs. to a gallon. The water is added by degrees, and well stirred in to prevent lumpiness. About an ounce of powdered alum is sometimes added to increase its adhesiveness; and for shoemakers and bookbinders about an ounce and a half of finely powdered rosin is substituted for the alum, which thickens it and renders it much more tenacious. When the ingredients are thoroughly mixed, they are boiled, great care being taken to stir them thoroughly while boiling, to prevent burning. This P. is used for a great variety of purposes, especially by paper-hangers, bill-stickers, book-

binders, pasteboard-makers, etc. An adhesive P., *Chinese Paste*, is made by reducing to perfect dryness bullocks' blood, which is then powdered and mixed with one-tenth of its weight of finely powdered quicklime. When used, it is mixed with water sufficient to form a P., which is a strong cement for pottery, wood, stone, etc.

Fruit Paste is made by taking the juice of any fruit and dissolving in it an ounce to a pint of gum arabic—or gum senegal, which many prefer; then evaporate by a gentle heat until the liquid is as thick as syrup, and add to every lb. of it a lb. of finely-powdered refined sugar; continue the heat, and stir it until the sugar and juice are thoroughly incorporated, after which it is poured out on a marble slab slightly oiled. When cooled, it may be formed into lozenges for use. An imitation of this is often made by mixing 3 parts of citric acid, 24 parts of gum, and 48 parts of refined sugar, and dissolving the whole in water, and gently heating it to insure complete solution and mixture. It is then variously colored and flavored with any of the fruit essences. This P. is often sold under the name of jujubes, which were formerly lozenges of fruit P. prepared from the juice of the jujube fruit, *Ziziphus jujuba*.

Polishing Pastes vary according to the materials upon which they are to be employed. For brass, the best kind is a mixture of two parts of soft soap with four parts of rotten-stone in very fine powder. Another sort is eight parts of fine rotten-stone powder, two parts of oxalic acid powdered, three parts olive-oil, and enough turpentine to make them into a P. For iron, a mixture of emery powder and lard is used; for pewter, a mixture of finely powdered bath-brick and soft soap. For wood, a paste called furniture P. is made by adding spirit of turpentine to bees-wax sufficient to form it into a soft P., which is rubbed on thinly with a brush and woolen rag, and afterward polished with a dry woolen cloth and soft brush.

Shaving pastes are very numerous, but the base of all is soap. For other applications of the word paste, see GEMS, IMITATION: MACARONI.

PASTEL, n. *păs'tĕl* [Sp. and F. *pastel*—from It. *pastello*, a bit of pie, a pastel—from mid. L. *pastillum*, a little loaf or roll—from L. *pastus*, food: OF. *paste;* It. *pasta*, paste]: a plant called the woad, and the blue dye which it yields; *Isătis tinctōrĭă*, ord. *Cappar'ĭdācĕæ;* a kind of paste made of chalk mixed with other materials and various colors, and formed into Pencils or Crayons (q.v.). Drawings with such dry, colored crayons may be made on paper or parchment, and have been used especially in portraiture.—PASTEL is also a name for Wood (q.v.)

LOUIS PASTEUR.

PASTERN, n. *păs'tėrn* [OF. *pasturon*, the pastern of a horse, fetters—from *pasture*, a tether: F. *pâturon:* mid. L. *pastōrĭŭm*, a shackle with which horses were tethered at pasture, the joint on which the shackle was fastened: It. *pastoja*, the pastern of a horse, fetters]: the lowest part of a horse's leg, consisting of the foot under the fetlock to the hoof or heel; in *OE.*, tethers or clogs tied to the feet. PASTERN JOINT, the joint next the foot.

PASTEUR, *pâs-tėr'*, LOUIS: born 1822, Dec. 27, Dôle, dept. of Jura, France: chemist, microscopist, and biologist. He entered the university 1840; took the degree SC.D. 1847; was appointed prof. of physics at the Faculty of Sciences, Strasburg, 1848; dean of the Faculty of Sciences at Lille 1854; 'scientific director' of the École Normale, Paris, 1857; prof. of geology, physics, and chemistry in the École des Beaux Arts, Paris, 1863; prof. of chemistry at the Sorbonne 1867. Science is indebted to P. for important services in molecular chemistry, which won for him the Jecker prize 1861, and other tokens of appreciation. But his highest honors have been gained in the department of the chemistry of ferments and in that of mycology. He has studied the causes of sundry 'diseases' of wine, and provided an effectual method of preventing them. He investigated the disease of the silk-worm when it threatened ruin to an important French industry, and discovered both its cause and the cure. Not less important is P.'s discovery of the cause (*bacilli*) of anthrax in cattle, and of a means of cure by inoculation. In studying the subject of rabies, he traced it to the presence of microbes in the medulla oblongata of the rabid animal: his method of treating hydrophobia is by inoculation with attenuations of the medulla and spinal cord of rabbits that have been infected with rabies. See BACTERIUM: GERM-THEORY: RABIES.—In recognition of his distinguished services to science and industry, P. received from the Austrian ministry of agriculture a prize of 10,000 florins 1872; from the Société d'Encouragement a prize of 12,000 francs 1873; from the French nation, by vote of the national assembly, a life-pension of 12,000 francs 1874, to which was added a retiring-pension as ex-prof. 1875. He was decorated with the cross of the Legion of Honor 1853; chosen member of the Institute 1862; officer of the Legion of Honor 1863; commander 1868; grand officer 1878. The London Royal Soc. awarded to P. the Rumford Medal for his researches relative to the polarization of light 1853, and 1869 he was elected foreign member of that society. Funds have been contributed liberally for the support of the Institut Pasteur, in which his treatment of hydrophobia is administered. He is the author of many articles in periodical publications, and of a few books on the subject of his researches. He d. 1895, Sept. 28.

PASTEUR' IN'STITUTE, New York: hospital for treatment, according to Pasteur's method, of persons bitten by rabid dogs and other animals: see Hydrophobia: Pasteur, Louis: Rabies. The P. I. was founded 1890, Feb. 18, by Dr. Paul Gibier, sometime associated with Pasteur. In the first 8 months after the P. I. was opened, 610 persons applied for treatment; but it was ascertained that 480 of them were in no danger of developing hydrophobia, investigation having shown that the animals by which they had been bitten were not victims of rabies. In the remaining 130 cases, the Pasteur inoculations were administered, hydrophobia having been demonstrated either by veterinary examination of the animals, or by inoculation in the laboratory, or by the result of bites inflicted by the same animals on other persons. These inoculated patients all escaped hydrophobia. Of the former class of applicants, 400 received the medical treatment or consultation gratis, and of the latter class 80. Of the patients who received the medical treatment, 64 were from N. Y., 12 from N. J., 12 from Mass., 8 from Conn , 9 from Ill., 1, 2, or 3 severally from 13 other states.

PASTEURIZATION : process of sterilizing milk—killing the germs by a temperature considerably below the boiling-point.

PASTEUR'S SOLUTION, n. *pâs-tėrz'-* [after the celebrated French biologist]: in *biol.*, a solution in which to cultivate ferments from spores.

PASTICCIO, n. *păs-tĭch'ĭ-ō* [It., a mess or medley]: a medley; an 'olio; in *painting*, a work of art, of original conception as to design, but a direct copy of the style and manner of some other painter.

PASTIL, n., or Pastille, n. *păs-tēl'* [dim. of Fr. *pastille*—from L. *pastillum*, aromatic lozenge—from *pastus*, food: It. *pastello* (see Paste)]: aromatic or medicated sugar-drop or lozenge: in *art*, thin, round cake of water-color material, less hard than the solid cakes: composition of aromatic woods in the form of a small cone, burned either as incense or for diffusing an agreeable odor. These cones, known as *fumigating pastils*, are composed of charcoal powder, with such aromatic gums as benzoin, labdanum, etc.; and powders of sweet-scented woods and barks, as sandal-wood, cinnamon, and especially cascarilla barks. Essential oils are added, and the whole is worked into a paste with a little gum-mucilage, and formed into small sharp-pointed cones about an inch and a half high, and half an inch broad at the base. When perfectly dry, they are used by lighting at the point, and as they burn down an agreeable odor is given out with the smoke. Very tasteful vessels, called P. burners, usually of porcelain, are made for using them. Another kind of P., usually in the form of a small pill covered with gold or silver leaf, is used for perfuming the breath; it is of the same ingredients, excepting the charcoal.

PASTIME, n. *păs′tīm* [Eng. *pass*, and *time:* F. *passe-temps:* It. *passa tempo*]: that which amuses and serves to make time pass pleasantly; amusement; entertainment.

PASTO, *pâs′tō:* town of the United States of Colombia, on a high plateau between two ridges of the Andes, 148 m. n.e. of Quito; more than 8,500 ft. above sea-level. It is in the direct route from the Popayan Pass to Quito. Pop. about 7,000.

PAS′TON LETTERS: collection of family and friendly correspondence, 1422–1505, addressed mainly to John Paston, Esq., Norfolk, England (d. 1466), to his son Sir John, and to other members of the same house. They contain valuable illustrations of social life and civil history during the Wars of the Roses. The P. L. were published first by John Fenn 1787. See ed. by James Gairdner (1872–75).

PASTOR, n. *pâs′tėr* [L. *pastor*, a feeder, a shepherd—from *pasco*, I feed: It. *pastore:* F. *pasteur*]: shepherd: clergyman having the care or spiritual feeding of a church and flock. PASTOR-LIKE, or PAS′TORLY, a. *-lī*, becoming a pastor. PAS′TORLESS, a. *-lĕs*, without a pastor. PAS′TORATE, n. *-āt*, or PAS′TORSHIP, n. *-shĭp*, the office or jurisdiction of a pastor. PAS′TORAL, a. *-ăl* [F.—L.]: pertaining to shepherds; pertaining to the care of a flock or a church; addressed to the clergy of a diocese by its bishop (see PASTORAL LETTER): rustic; rural: N. a sort of dramatic poem on the incidents of a country life (see PASTORAL POETRY): a bishop's pastoral letter, or that of a council of churches, or of an ecclesiastical court, addressed to both clergy and people. PAS′TORA′LE, n. *-tŏ-rā′lĕ*, in *music*, an air in a tender, soothing strain; the figure of a dance.

PASTOR, *pâs′tėr:* genus of birds of the starling family (*Sturnidæ*), differing from starlings in the compressed and slightly curved bill. In habits, as in characters, they are very nearly allied to starlings. The name P. is

Rose-colored Pastor (*Pastor roseus*).

supposed to be derived from their being frequently seen with flocks of sheep. The only European species is the ROSE-COLORED P., or Rose-colored Ouzel (P. *roseus*).

PAS'TORAL EPIS'TLES: three epistles of the apostle Paul—viz., two to TIMOTHY (q.v.) and one to TITUS (q.v.): named pastoral because the contents relate chiefly to the pastoral care of Christian churches. Notice is taken here of difficulties common to the three epistles, and having reference to authenticity and dates. The difficulties are of a nature that might be expected, have involved much minute discussion, and can never probably be removed wholly, though a reasonable conclusion may be reached. They are in part linguistic, in part historical. First, in respect to the linguistic, it is claimed that the epistles contain 133 words not occurring in other writings ascribed to Paul, though found elsewhere in the N. Test.; also, that many of his most characteristic expressions are absent, and that some of these, particularly, are replaced by substitutes; and, further, that there is a tendency to unusual compound words, while there is a simpler style—an absence of the highly involved sentences found in his longer epistles. On the other hand, it is affirmed that there is a large element of thought and language in common with his other writings, and a considerable resemblance to the epistle to the Galatians in particular; and that a forger would have made resemblances even more striking, or would have avoided striking differences. If the epistles can find no satisfactory place except in the acknowledged hiatus of his journal during the last years of the apostle, the discrepancies of style would be the more easily explained, namely, by the fact that style is well known to change, in many instances, with advancing years, and in this case may have changed even in the use of Greek particles, on which much emphasis is laid by critics. Moreover, the apostle was a cultured and progressive man, alive to everything, and in constant motion, coming in contact with new peoples and dialects and ideas, continually; and these were not elaborate letters to churches, through amanuensis or secretary, but direct, free, informal letters to companions in work. All this goes far to remove the objections that concern diction; and, indeed, both the style and spirit, in letters so addressed, have a stamp of genuineness that confirms the testimony from the Christian fathers, who refer to the epistles as well-known ones of the apostle Paul. The other line of objection, the historical, has to do with time and place of writing. At first glance, the letters themselves seem to make this clear. The first to Timothy speaks of the apostle as having gone into Macedonia and left Timothy at Ephesus; the second to Timothy places the writer then, or then recently, in Rome, in prison after a trial, near the end of his life, expecting Timothy, and refers to an apparently recent visit to Troas, Corinth, and Miletus; the epistle to Titus presents the writer and Titus as recently in Crete, where the latter had remained, while the writer was to winter at Nicopolis. Various attempts have been made to fit I Tim. and Titus into what itinerary we have of

the ceaseless journeyings of the apostle; but there are objections to the hypotheses. An important point is that a forger would have made a clear place and time. The difficulties, in the absence of a continuous and complete life of Paul, have been indefinitely adjourned by supposing that, after a journey to Spain, he went to Ephesus, and thence to Macedonia (on his way writing I Tim.); then to Crete, after which he wrote to Titus, when about to start for Nicopolis, at which place, having visited Miletus and Corinth on his way, he may have been arrested the second time and taken to Rome, where he wrote II Tim. Still other objections have been raised in regard to the heresies denounced in these epistles: a laborious effort has been made to identify them with forms or developments of error later than the time of Paul, and to show that so great a corruption of doctrine could not have ripened in the short time of the churches' existence. But there is no proof that the errors were other than the first inroads of the Judaizing and theosophizing and antinomian tendencies elsewhere referred to in the N. Test. (e.g., Acts xx. 29–30 and Col. ii. 8–23). It certainly does not take a generation for false teaching to arise, especially in times of movement and intellectual ferment. On the radical side of this discussion may be mentioned Baur, Eichhorn, and, in part, Schleiermacher; on the conservative, *Meyer's Commentary*, Dr. Wace in the *Speaker's Commentary*, and Farrar's *Genuineness of the P. E.*, and his *St. Paul.*

PAS'TORAL LETTER: letter addressed either at stated times, or on some notable occasion, by a 'pastor,' but especially by a bishop, to the clergy under his jurisdiction, to the laity of his flock, or to both. Of the former class, in the Church of Rome, are the so-called Lenten Mandates, or instructions, issued before the commencement of Lent, and making known the regulations enacted for the observance of the Lenten fast, the dispensations granted, and the devotions and other pious works prescribed. Such are also the letters issued by a bishop on many of the chief festivals of the year. It is usual for bishops, besides their stated letters, to address to their clergy or people instructions suited to any particular emergency, and sometimes to take occasion from the issuing of the stated P. L. to offer instruction on some topic of importance which may engage public attention at the time, on some prevalent abuse or scandal, or some apprehended danger to the faith or to morals. To this class belong many fragments from the early Fathers, especially in the Western Church. In some countries the govt., as formerly in Austria, claimed to exercise a censorship over the pastoral letters to be issued by the bishops. This right, however, is regarded by churchmen as a usurpation, and, although submitted to, is admitted only under protest: see PLACETUM REGIUM: FEBRONIANISM

PASTORAL POETRY.

PAS'TORAL PO'ETRY deals with the scenery, sentiment, and incidents of shepherd life. While the early rhythmic expression of the race was largely pastoral in character, pastoral poetry became a distinct art form at a comparatively late period. In fact, it was only after innocence and simplicity had passed away, or were thought to have passed away, from real life, that men began, half from fancy, half from memory, to paint the manners of the past as artless, and the lives of their ancestors as constantly happy. Thus the *Brass* age made the *Golden*. The oldest specimens of the classic pastoral are the Idyls of Theocritus (q.v.), about B.C. 275—long after Greece had produced her masterpieces in epic narrative, in the war ode, and other kinds of the lyric, in tragedy, comedy, history, philosophy, and rhetoric. Theocritus was imitated by Bion and Moschus, whose pastorals approximate in form to the drama. Among the Latins, the refined and courtly Virgil, in the reign of Augustus, wrote his *Bucolica*, or *Eclogues*, on the model of his Greek predecessors; but, however beautiful and melodious the verses of these urban writers are, we do not find in them a genuine picture of pastoral life.

During the middle ages, pastoral poetry in this artistic, therefore conventional, sense of the term, was almost unknown; but with the first glimpse of reviving classicism, the pastoral reappears. The earliest specimens are afforded by Boccaccio (q.v.), one of the first modern Italians to study Greek. To the countrymen of Boccaccio we owe the pastoral drama, of which there is no trace in ancient literature. The *Favola di Orfeo* of Poliziano (q.v.), performed at the court of Mantua 1483, is the first dramatic poem which pretends to represent the sentiments, incidents, and forms of pastoral life. Critics have forgotten this work, and made Tansillo inventor of the *favola pastorale* or *boscareccia*, on account of his *I due Pellegrini* (1539), also Agostino Beccari, whose pastoral comedy *Il Sacrifizio* was played at Ferrara 1554. However, it is true that the extraordinary popularity of Beccari's piece originated a crowd of *favole boscarecce*, the finest and most poetical of which is the *Arminta* of Tasso, represented at the court of Ferrara 1572. A later but hardly less famous production is the *Pastor Fido* of Guarini (q.v.), pub. Venice 1590; and in the 18th c., the poet Metastasio (q.v.) revived for a moment the interest in this graceful and picturesque, but unreal, branch of literature. In Spain, during the first part of the 16th c., it abundantly flourished. The first who wrote pastoral dialogues was Juan del Elcina (about 1500); he was followed by Garcilasco de la Vega, and others. During the reign of Emperor Charles V., one may say that Spanish imaginative literature was almost wholly of a bucolic character; but in Spain, as elsewhere, it took largely the form of prose-romance (see NOVELS) rather than of

poetry; deriving its inspiration from the *Daphnis* and *Chloe* of Longus, the Byzantine romancist, not from the tuneful strains of Virgil. England, however, can boast of Spenser's *Shepherd's Calendar*, which is at least full of charming poetry, and is appropriately dedicated to Sir Philip Sidney, author of the pastoral romance, *Arcadia*. The Germans reckon Shakespeare's *As You Like It* in the list of pastoral dramas. Beyond dispute, it betrays the influence of the pastoral poetry and romance that had just ceased to be the rage among the scholarly geniuses of Europe. A similar influence is visible in the writings of other Elizabethan dramatists, e. g., in the *Faithful Shepherdess* of Fletcher and in the *Sad Shepherd* and the pastoral masques of Ben Jonson. In France, pastoral poetry is perhaps older than in any other western nation. The comedy of Adam de Lehalle, surnamed Le Bossu d'Arras (The Hunchback of Arras), entitled *Le Jeu de Robin et Marion* (still existing in MS. in the *Bibliothèque Impériale*), belongs to the middle of the 13th c. During the civil wars in the latter half of the 16th c., the pastoral was turned to political uses. In the 17th c., it continued for some time to be popular—rather, let us say, fashionable. Even the great Richelieu alleviated the cares of office with the composition of *La Grande Pastorale;* but here, too, the poem soon gave way to the prose-romance, hardly less unreal and far more exciting. The productions of this French school of pastoral poetry ranged from the artificiality of Fontenelle to the warmth of feeling and truthfulness of description which characterize Bernárdin de Saint-Pierre.

One of the best pastorals, ancient or modern, is the *Gentle Shepherd* of Allan Ramsay (q.v.), pub. 1725, a genuine picture of Scottish life, passed in simple rural employments. 'The affected sensibilities and feigned distresses of the Corydons and Delias find no place in Ramsay's clear and manly page. He drew his shepherds from the life, placed them in scenes which he actually saw, and made them speak the language which he every day heard.' His English contemporaries, Pope, Ambrose Philips, Gay, and others, who form the 'Augustan' or Queen Anne school of poets, also tried their hands at pastoral poetry; but though there is much fine description in the verses, they are, in general, purely conventional performances, in imitation of the classic poets, who did not imitate nature. From this censure, however, must be excepted the six pastorals of Gay, entitled *The Shepherd's Week*, which are full of honest country humor and charming pictures of English country life. Since the early part of the 18th c., however, pastoral poetry, strictly so-called, has ceased to be cultivated in England and almost everywhere else. In the pages of Wordsworth, who lived all his days among the Cumberland shepherds, are many exquisite glimpses of pas-

toral life, as it presented itself to the profound and tender imagination of that great poet of nature, but few direct delineations of pastoral manners. Pastoral poetry takes a high poetic and ethical tone in Milton's *Comus*, and Tennyson's fine fragment *Come down, O maid, from yonder mountain height*, is a delightful echo of the loveliest strains uttered by the Greek pastoral poets. Germany imitated abundantly the French and Italian models during the greater part of the 18th c. The last and best of the German series is the *Erwin and Elmire* of Goethe's youth.

Symonds, *Studies in the Greek Poets, First Series;* Patin, *Sur l'Pélogue Latin* (*Revue des Deux Mondes*, Tom. xv. 1838, pp. 234, 382); Sellar, *Roman Poets of the Augustan Age;* Ferrario, *Poesie Pastorali et Rusticali* (Classici Italiani, Milano, 1808); Fauriel, *Chants populaires de la Grèce Moderne* (1825); Garnett, *Folk-song of Modern Greece;* Gosse, *Essay on English Pastoral Poetry*, in Complete Works of Edmund Spenser, V. III. 1882–4. See also Lang's translation of Theocritus: Edmund K. Chambers, *English Pastorals*, in the *Warwick Library, London*, 1895).

PASTORAL STAFF; sometimes also, though not properly, called CROSIER (q.v.): one of the insignia of the episcopal office, sometimes borne also by an abbot. It is a tall staff of metal, or of wood ornamented with metal, having, at least in the Western Church, the head curved in the form of a shepherd's crook, as a symbol of the pastoral office. The head of the pastoral staff of an abp., instead of the crook, has a double cross, from which its name of *crosier* is derived. In the Greek Church the staff is much shorter, and the head is either a plain Greek cross of the form of the letter *Tau*, or it is a double-headed crook, which sometimes appears in the shape of the upsilon. It is difficult to determine the time at which first the pastoral staff came into use. The first distinct allusion to it is in St. Augustine's commentary on Ps. cxxxiv. Gregory of Tours, in his life of St. Martin, mentions the pastoral staff of St. Serverinus, bp. of Cologne in the end of the 4th c. From an early time, the pastoral staff was connected with the actual possession of the jurisdiction which it symbolizes. The giving of it was one of the ceremonies of investiture; its withdrawal was part of the form of deprivation; its voluntary abandonment accompanied the act of resignation: its being broken was the most solemn form of degradation. So also the veiling of the crook of an abbot's pastoral staff, during the episcopal visitation, signified the temporary subjection of his authority to that of the bishop. An abbot being required to carry his pastoral staff with the crook turned inward showed that his authority was purely domestic. The pope does not use a pastoral staff. In the later mediæval period the materail was often extremely costly, and, referring to the relaxation

of the times, it was said 'that formerly the church had wooden pastoral staves and golden bishops, but that now the staves are of gold and the bishops of wood.' The workmanship was sometimes extremely beautiful. We annex as a specimen of the highest art the P. S. of William of Wykeham, now in New College, Oxford. This is a sample of the Norman pastoral staff. The Saxon was much less tall. The Irish P. S. is of a type quite peculiar, and some of the sculptured specimens preserved in the British Museum, at the Royal Irish Acad., and elsewhere, are very interesting. St. Fillan's Crosier, now in Edinburgh, resembles these.

PASTORAL THEOLOGY: branch of theological science which regards the duties and obligations of Christian pastors in relation to the care of souls. It comprises two parts—first, that which treats of the obligations of the pastors themselves; second, that which comprises the objective teaching to be employed in the instruction and direction of the flock. Numerous works on the subject represent the practice of various sections of the Prot. Church; and more recently Rom. Cath. manuals of P. T. have appeared.

PASTOREAUX, n. *pâs-tô-rō'* [F. dim.—from *pastour*, a young shepherd]: in *chh. hist.*, the name given to those persons who took part in certain risings in France in the 13th and 14th c. It is probable that these outbreaks of what Blunt calls 'religious Jacquerie' were due in a large degree to the sufferings of the peasantry from the exactions of the nobility; and that the hostility displayed to the clergy was a consequence of their connection with the aristocracy. The first of these outbreaks took place in Berry 1214. The peasantry pillaged chateaux and religious houses, and proclaimed universal equality and the coming of the Holy Ghost. The second, 1250, had as ostensible objects the rescue of Louis VII. and the recovery of the Holy Sepulchre. It originated in Flanders, under the leadership of a person of unknown name, called the Master of Hungary, who, when he reached Paris, is said to have been at the head of 100,000 men. Here they usurped priestly functions, performed marriages, distributed crosses, offered absolution to those who joined the crusade, and inveighed against the vices of the priesthood. They separated into three divisions, and marched southward, where they were attacked and cut to pieces. The third occurred 1320, in the reign of Philip V., and was under the pretense of a crusade. The insurgents were excommunicated by Pope John XXII.; and being hemmed in in Carcassonne, numbers perished of disease and famine, and the survivors were put to death.

PASTRY, n. *pās'trĭ* [OF. *pastisserie;* F. *pâtisserie*, pastry—from *pâte*, paste (see PASTE)]: articles of food made of light puffy dough, as pies, tarts, etc.; in *OE.*, a room in which pasties were made. PASTRY COOK, one who makes pastry or sells it.—*Pastry* comprises articles of food in which the chief part consists of a paste made of flour. This would of course apply to bread, but it has been limited by custom to such lighter articles as are made by the pastry cook, and chiefly to those in which the paste is made to assume a light flaky character by the addition of butter, etc., and by the mode of working it. The commonest kind is made of a dough of flour and water, into which butter or lard is worked by hand, in the proportion of six ounces to the pound. The finest kind is usually termed *puff paste*, and considerable skill is required to make it well, for it depends, next to the goodness of the materials, upon lightness of hand in kneading. The ingredients consist of fine wheat-flour and butter in the proportion of four ounces of butter to a pound of flour, with cold water just sufficient to make a stiff elastic dough; this is rolled out with a *rolling-pin*, and double the previous quantity of butter is then spread over it. It is then rolled up, and lightly kneaded to work the butter in thoroughly. Coolness is very important in making pastry; a marble slab is preferable for making it upon. The thinner it is rolled out before the butter is spread the better, because when it is put in the oven the laminæ, which have been formed by folding or rolling up the butter with the dough, separate by disengagement of the watery vapor, and the thinner and lighter the flakes are the better is the puff paste. In the kind called *short paste*, the flour is made warm, and the butter or lard used is often melted, and a little sugar and an egg or two are added. This, when baked, has not the flakiness of puff paste, but it is better adapted for meat and some other kinds of pies which require to be baked without a dish. Game pies, with elaborately decorated crusts, are made of this pastry.

PAS'TURAGE, in English Law (called Common of Pasture): one of the rights of common, or profits *à prendre*, and the right of one who is not the owner of land to put his sheep or cattle on such land, to feed there: it may be established by prescription—in England of 30 years, in Scotland 40 years.

PASTURE, n. *pâs'tūr* [OF. *pasture;* F. *pâture*, herbage—from L. *pastūrā*, pasture—from *pastus*, nourished or fed]: land under grass for grazing of cattle; the grass itself: V. to supply with grass or pasture; to graze. PAS'TURING, imp. feeding on grass-land; grazing. PAS'TURED, pp. *-tūrd*. PAS'TURAGE, n. *-tū-rāj*, grazing-ground; grass-land for feeding cattle or sheep; grass on which they feed. PAS'TURABLE, a. *-rā-bl*, suited for pasturing. PAS'TURELESS, a. *-tūr-lĕs*, destitute of pasture.

PASTURE.

—A *Pasture* is a field or tract of land allotted to the feeding of oxen, sheep, and other herbivorous animals which eat the grass and other herbage as it grows. The P. is an important portion of the farm; as for from 6 to 10 months of the year, according to the latitude of its location, it supplies a large proportion of the food of these animals. Upon the quantity and quality of the food which it produces the growth and productiveness of the animals kept thereon will largely depend. If the quantity is insufficient or the quality inferior, additional food must be supplied to the animals at the barn or elsewhere. If no P. is provided, the owner of the animals must keep them on dry food, or else, in part at least, adopt the soiling system (see SOILING OF CATTLE). But on most farms the P. is the main, and in many cases the only, source of food for cattle during the summer.

In England, great care is given to making and maintaining pastures, but in the United States they are usually fields from which the forest growth has been removed, but which are otherwise unimproved and receive little attention. There are exceptional cases in which the P. is occasionally alternated with a cultivated field, the former being temporarily given to crops and the latter to pasturage. Where the conditions are favorable, this course is to be commended, but there are large areas of P.-land not adapted to cultivation. In fitting land for P., the sod should be turned, a liberal application of well-rotted manure or commercial fertilizer harrowed in, the surface soil made very fine, and an abundant quantity of seed should be sown. Among the large number of excellent varieties of grass for P. are timothy (*Phleum pratense*), blue grass (*Poa pratensis*), orchard grass (*Dactylis glomerata*), red-top (*Agrostis vulgaris*), fowl meadow grass (*Poa serotina*), and meadow fox-tail (*Alopecurus pratensis*). In localities where they thrive, red clover (*Trifolium pratense*) and white clover (*Trifolium repens*) are valuable additions to the grasses. The mixture of several varieties gives a much better and more enduring P. than can be secured from any one sort grown by itself. It is best to mow the land one season after seeding, in order that the sod may become firm before the cattle are turned upon the field.

Under the ordinary system of management of the P. there will be a gradual exhaustion of the elements of fertility from the soil. This process goes on more slowly where sheep are pastured than where cows are kept, as the latter, being removed from the P. at night, leave much of their manure elsewhere. They also require large quantities of the phosphates for milk production. The P. is liable to deterioration also by the appearance of coarse herbage, weeds, and bushes, and of spots in which the grass has become winter-killed or which by other means have been made unproductive. To prevent these evils, an occasional application of manure or fertilizer is required, and foreign growths should be kept

down by prompt and frequent mowings. The bare spots, if small, can be harrowed, fertilized, and reseeded; but if they are extensive, or if weeds and bushes are numerous, the whole field should be plowed, manured, and carefully fitted for a permanent feeding-ground. The more promptly remedial measures are taken the less will be the expense involved. Either stable manure, ashes, super-phosphates, or high-grade special fertilizers for pastures, will be found excellent to prevent exhaustion of the soil and to increase productiveness. Very close feeding is to be avoided, and it is important that cattle should not be turned upon the P. too early in the spring or be allowed to remain late in the fall.

When the pastures are insufficient, the stock should be fed in part at the barn. On most farms this is necessary during the latter part of the summer. There are various crops which may be profitably grown for this purpose (see FODDER—*Green Fodder*), and cows giving milk may be fed also with moderate quantities of grain. It is necessary to keep the P. inclosed with a substantial fence (see FENCE), and its usefulness will be greatly increased by dividing it into two or more portions and changing the stock occasionally from one field to another. Shade should be provided either by means of trees or sheds, and in every P. there should be abundance of pure water. The latter items are essential to the health and comfort of the animals, and will contribute to the profit which their owner will secure.

PASTY: see under PASTE.

PAT, n. *păt* [a word imitative of the sound of a light blow: Swed. *pjätta*, to pat: F. *patte*, a paw]: a light, quick blow: V. to strike or stroke gently with the fingers; to tap: ADJ. convenient; exactly suitable: AD. at the precise moment; fitly; conveniently. PAT'TING, imp. PAT'TED, pp. *Note.*—PAT, in the sense of 'convenient, exactly suitable,' may be an adaptation of Eng. *apt.* Skeat says this sense is due to a confusion with the Dut. *pas*, Ger. *pass*, fit, convenient, suitable.

PAT, n. *păt* [Gael. *pait*, a lump; *paiteag*, a small lump of butter: or perhaps from the idea of a small soft lump being thrown down]: a small lump of butter made up.

PAT, n. *păt:* a familiar sobriquet of an Irishman, being a corruption of Patrick.

PATACA, n. *pa-tā'ka* [Sp.]: Spanish coin, of the value of about $1.12; Algerian coin, of the value of about 36 cents.

PATACON, n. *păt-a-kŏn'* [Sp.]: the unit of value in the Argentine Republic; called also *peso duro*, hard dollar. Originally it was worth $1.00, but is now represented by paper currency valued at about half that sum. Also a gold coin of Uruguay, worth about $.965.

PATACOON', or PATTACOON': same as PATACA

PATAGONIA.

PATAGONIA, *păt-a-gō'nĭ-a:* most southern region of the S. Amer. continent, extending from lat. 39° s. to the Strait of Magellan, which, for 300 m., separates P. from the desolate archipelago of Tierra del Fuego. Length more than 1,000 m., greatest breadth about 480 m.; about 322,550 sq. m. Pop. doubtfully estimated about 20,000. Like the rest of the continent, P. is divided by the Andes into two very unequal and dissimilar territories. Since 1881, nearly the whole country e. of the watershed has been formally recognized as part of the Argentine Republic; while Chili, which previously claimed a considerable share of that area, has contented herself with the country to the w. and a strip along the s. coast. Thus the political in the main agrees with the physical partition.

Western or Chilian P. (63,000 sq. m.), comprising the territory of Magellan, is rugged and mountainous. Along the coast, and stretching from 42° s. to the Strait of Magellan, are numerous islands, with precipitous shores, belonging apparently to the system of the Cordilleras. The principal islands are the Chonos Archipelago (q.v.), Wellington Island, Archipelago of Madre de Dios, Queen Adelaide's Archipelago, and Desolation Island. These islands, together with several peninsulas, notably Taytao, form a coast almost as rugged as that of Norway; but in none of them do the mountains rise to the snow-line. Even in the Cordilleras proper, the summits are not so lofty as in the more northern parts; but the following at least are worthy of note—the volcanoes of Minchinmavida (8,000 ft. high) and Corcovado (7,510 ft.), Monte San Valentin (12,697 ft.), Chalten or Fitzroy volcano (7,120 ft.), rising above the Santa Cruz lakes and in more or less active eruption since its discovery 1867, and, finally, Mt. Stokes. The slope of the country from the Andes to the Pacific is so steep, and the strip of shore so narrow, that the largest river of this district has its source only about 13 m. from the coast. In the island of Chiloe, n. of Western P., the mean temperature of winter is about 40°, that of summer rather above 50°; while at Port Famine, 800 m. nearer antarctic latitudes, the mean temperature is not much lower, being in winter about 33°, in summer about 50°. This unusually small difference in the mean temperature of the extremes of Western P. is due to the great dampness of the atmosphere all along the coast. The prevailing winds blow from the w.; heavily charged with moisture from the Pacific Ocean, they strike against the Andes, and cause almost perpetual precipitation from Chiloe to the Strait of Magellan. South of 47° s. lat., hardly a day passes without rain, snow, or sleet. This continual dampness has produced forests of almost tropical luxuriance, which yield valuable timber (alerce, cipré, Chilian beech, Winter's bark). Coal is mined in the neighborhood of Punta Arenas (Sandy Point), on the e. side of Brunswick Peninsula, opposite the Broad Reach of Magellan's Strait; and here the

Chilian govt. has, since 1851, a colony and penal settlement; pop. (1882) 1,291.

Eastern or Argentine P. consists mainly of high undulating plains or plateaux rising in successive terraces, and frequently intersected by valleys and ravines. These plateaux are covered occasionally with coarse grass, but more frequently with a sparse vegetation of stunted bushes and herbs; even these are sometimes wanting, and elsewhere the surface is strewn with huge bowlders, and again rugged with heaps or ridges of bare, sharp-edged rocks, many of volcanic origin. Keen blasts sweep from various points, but chiefly from the w.; and as this wind has already parted with its moisture on the other side of the mountains, hardly any rain falls in Argentine P. during seven or eight months of the year. The descent from the plains to the valleys is commonly by 'barrancas,' or scarped slopes, varying in depth from 50 to 2 or 3 ft., and in angle from an easy incline to an almost perpendicular precipice. The soil in many places is strongly impregnated with saltpetre, and salt lakes and lagoons are numerous. North of the Rio Chico, and toward the sea-coast, there is a wild, weird, desolate region called by the Indians 'The Devil's Country.' Several wastes of this kind fringe the Atlantic, and formerly induced the belief that P. was a barren and waterless desert; but the interior, though not fertile, really abounds in lagoons, springs, and streams, and the banks of the rivers are capable of cultivation. Along the eastern base of the Andes, also, there is a great tract astonishingly picturesque and fertile, with great forests to which the Indians retire for shelter from the freezing winds of winter. The principal rivers of Argentine P. are Rio Negro (q.v.), the n. boundary; the Chupat, which flows through a good soil, producing pasture and firewood; Rio Deseado; Rio Chico; Santa Cruz; and Rio Gallegos. All these rivers rise in the Andes, and flow e., n.e., and s.e., and several are fed by 'sub-alpine' lakes. One of the head-waters of the Rio Negro flows from Lake Nahuel Huapi (discovered 1690), and the Santa Cruz from Lago Argentino, one of an unrivalled group comprising, besides San Martin, Moreno, and Viedma lakes, several others as yet unexplored. W. of San Martin and Moreno appears the smoking summit of Chalten; and the whole scenery of the district, with rugged mountains rising sheer from the water, with glaciers, snows, and floating icebergs, is unspeakably grand and terrible. Other lakes are Lago Buenos Ayres and Colguape, the latter in the valley of the Sengel, tributary of the Chupat. The whole of Eastern P. has probably been raised above the sea-level in the tertiary period, and its most characteristic geological feature is its boundless expanses of shingle. The flora is in consequence exceptionally poor, and appears to be derived mainly from the lower slopes of the Andes. Herds of horses, dogs, and, in the more favored regions, cattle are bred; pumas and foxes, armadillos, skunks, and tucotucos

(a peculiar rodent) are seen; and among the birds are condors, hawks, partridges, and flamingoes, ducks and other water-fowl. But by far the most important animals are the Guanaco (q.v.) or huanaca, sometimes in herds of 200 or more, and two species of ostrich (*Rhea Darwinii* and *Rhea Americana*), the mekyush of the Patagonians (see NANDU).

Inhabitants.—The pop. of Western P., estimated 1884 by Señor Carvallo at not more than 3,200 (or, including Tierra del Fuego, 4,000), consists of a number of small indigenous nomadic tribes of Araucanian stock who live by fishing and hunting; and the settlers at Punta Arenas or Magellan's colony, mainly immigrants from Chiloe (Chilotes) and other parts of Chili. The state of matters in Eastern P. is too transitional to allow of satisfactory calculation of the number of inhabitants. The Argentine authorities have since 1881 driven considerable bodies of troublesome Indians (Puelche) from the Pampas southward across the Rio Negro; Argentine herds men are beginning to pasture their cattle in the n. valleys, and Chilian immigrants are said to be rapidly moving east. The Patagonians proper, or Tehuelche Indians, who are confined to Eastern P., number perhaps about 7,000. They are generally divided into two great tribes, the n. and the s., which speak the same language, but are distinguishable by difference of accent; but Pikchoche, the Patagonian examined by the Ethnographical Soc. in Berlin 1879, reported the existence of seven distinct tribes—Tölken, Kholpen, Lalamitch, Ankatch, Eiré, Toker, Haveniken. The northern tribes range chiefly over the district between the Cordillera and the Atlantic, from the Rio Negro to the Chupat, and even the Santa Cruz river. The southern, who appear taller and finer, and are more expert hunters, occupy the rest of P. as far s. as the Strait of Magellan. The two divisions are much intermixed, and frequently intermarry. Though the extravagant statements by some as to the gigantic stature of the Patagonians have led others to deny their claim to be considered exceptional, there is no doubt that they are one of the tallest races on the globe. The average height of the male members of Musters's party was rather over 5 ft. 10 inches; two others, measured at Santa Cruz, stood 6 ft. 4 inches each; Pikchoche was 5 ft. 9 inches high, and stretched 5 ft. 11 inches with his arms. The muscular development of the arms and chest is extraordinary, and in general the body is well proportioned. The Patagonians are excellent swimmers, can walk great distances and for two and even three days together without being tired. Their cranial characteristics are somewhat disguised by the fact that the hinder part of the skull is artificially flattened, the custom being to strap the child's head back to a board to prevent it 'waggling' when carried about the country on horseback. This process, however, appears only to confirm and exaggerate a natural tendency; and it is asserted by the most scientific investigators (Virchow

and others) that the Patagonian skull is, next to that of the Lapps, the shortest in the world, or nearest the type of the chimpanzee. The jaws are powerful, though with no trace of prognathism, and give a leonine cast to the countenance. The expression of the face is ordinarily good-humored though serious, except in the settlements: their eyes are dark brown, bright and intelligent, their noses aquiline and well formed, their foreheads open and prominent. The complexion of the men, when cleansed from paint, is reddish or rather yellowish brown. Thick flowing masses of long, coarse, black, glossy hair cover their heads, and are combed out by their wives at least once a day. The scanty natural growth of beard, mustaches, and even eyebrows, is carefully eradicated. The young women are frequently good-looking, displaying healthy, ruddy cheeks when not disguised with paint. The dress of the men consists of a *chiripa* or under-garment round the loins; a long mantle of hide with the fur inside, and drooping from their shoulders to the ground; and 'potro' boots or buskins made from the skin of a horse's hock, and occasionally from the leg of a large puma. The dress of the women is similar, except that the under-garment is made of calico or stuff, and extends from the shoulders to the ankle. Both sexes are fond of ornaments, wearing huge ear-rings of square shape, suspended from small rings passing through the lobe of the ear; also silver or blue-bead necklaces. The weapons of the Tehuelches consist of gun or revolver; sword or dagger; a long, heavy lance; and the *bola perdida*, or single ball, so called because, once thrown from the sling, it is not picked up again.

Their *toldos*, or tents, capable of holding about 25 persons, are formed of three rows of stakes driven into the ground. The middle row is higher than the others, and the three rows are tied together with strings of hide. This framework is covered with hides which reach the ground on all sides, and are fastened to it by small stakes of bone. At nightfall, guanaco hides are spread on the ground within the tents, and the men and women, laying aside their mantle, or using it as a blanket, go to sleep in the same apartment. Men, women, and children bathe in cold water every morning throughout the year; and though this may not free them from vermin, yet it prevents disease, and hardens them against the severities of winter. Besides mantles of guanaco hide, their only manufactures are saddles, bridles, stirrups, and lassos, which often evince wonderful ingenuity and nicety of execution.

The Patagonians believe in a great and good spirit who created the Indians and animals, and who dispersed them from a place which they call 'God's Hill,' but takes no concern with the beings whom he has created. Idols are unknown, and Musters saw no trace of any periodic religious festival. Whatever religious acts the natives performed were prompted by dread of demons, the chief of whom, Gualichu, is always on the watch to cause mis-

chief. To propitiate or drive away this spirit is the function of the wizard, who (as in other countries) combines the medical and magical arts. The Gualichu is invisible (except to the 'doctor,' who has the gift of second-sight), and he can enter into the bodies of people, and cause sickness and disease of every sort. Many other evil spirits are supposed to inhabit subterranean dwellings, and are saluted on occasion with special incantations. The cry of the night-jar on the Cordillera betokens sickness or death, a certain toad-like lizard mysteriously lames horses, a fabulous two-headed guanaco is a sure forerunner of epidemic disease, etc. Charms and talismans are liberally employed.

Kindly, good-tempered, impulsive children of nature, the Tehuelche take great likes or dislikes, becoming firm friends or equally confirmed enemies. They are steadily decreasing, through the combined effect of disease and bad liquor supplied by traders, and before long the race will be extirpated. The language is quite different from either Pampa or Araucanian. Of European settlements there are few in Argentine P. The oldest, Patagones (formerly El Carmen), really lies on the n. side of the Rio Negro, about 18 m. from its mouth; pop. about 2,000, Spanish and other settlers, negroes, and convicts from Buenos Ayres. In the valley of the Chupat is a Welsh colony dating from 1865, numbering (1884) about 6,000; and at the mouth of the Santa Cruz, farther s., there is a petty station. The settlement of the dispute between the Argentine Republic and Chili is expected to give a stimulus to colonization.

History.—Magellan, before passing through the strait, had in 1520 sailed along the whole Patagonian coast; and it was from the large footsteps (*patagones*) observed near his winter quarters at S. Julian that the country derived its name. The great plain was traversed by Rodrigo de Isla 1535. Sarmiento de Gambo (commemorated by the mountain in Tierra del Fuego) added greatly to the knowledge of the w. and s. (1579–80), and at Nombre de Dios and San Felipe (Port Famine) founded Spanish settlements, doomed to early extinction. English interest in the country, aroused by Drake's voyage 1577, was kept up by Davis, Narborough, Byron, Wallis, and the Jesuit Falkner; and at last the beginning of a real and scientific acquaintance with the interior was made by King, Fitzroy, Darwin, and Musters. Since 1870 careful explorations have been made by Moreno, Lista, Moyano, and other Argentine travellers.

English works on P. are Falkner's (1774) Snow's (1857), Musters's (1871), Beerbohm's (1878), Lady Florence Dixie's (1880), and Coan's (1880).

PATAGONIAN, a. *păt'ă-gō'nĭ-ăn:* a native of *Patagonia*, S. America.

PÂTÂLA, *pâ-tâ'la* [from *pat*, fall]: in Hindu mythology, name of those inferior regions which have seven, or, according to some, eight divisions, each extending downward 10,000 *yojanas*, or miles. The soil of these regions,

as the *Vishn'u-Purân'a* relates, is severally white, black, purple, yellow, sandy, stony, and of gold; they are embellished with magnificent palaces, in which dwell numerous Dânavas, Daityas, Yakshas, and great snake-gods, decorated with brilliant jewels, and happy in the enjoyment of delicious viands and strong wines. There are in these regions beautiful groves, and streams and lakes, where the lotus blows, and the skies are resonant with the kokila's songs. They are so delightful, that the saint Narada, after his return from them to heaven, declared among the celestials that P. was much more delightful than Indra's heaven. Prof. Wilson, in his *Vishn'u-Purân'a*, says 'that there is no very copious description of P. in any of the *Purân'as;* that the most circumstantial are those of the *Vâyu* and *Bhâgavata Purân'as;* and that the *Mahâbhârata* and these two *Purân'as* assign different divisions to the Dânavas, Daityas, and Nâgas. . . . The regions of the P. and their inhabitants are oftener the subjects of profane than of sacred fiction, in consequence of the frequent intercourse between mortal heroes and the serpent-maids. A considerable section of the *Vr'ihat-Kathâ* consists of adventures and events in this subterraneous world.' For inferior regions of a different sort, see NARAKA.

PATANJALI: name of two celebrated authors of anc. India, generally deemed the same personage, though apparently for no other reason than that they bear the same name. The one is author of the system of philosophy called Yoga (q.v.), the other the great critic of Kâtyâyana (q.v.) and Pân'ini (q.v.). — Of the former, nothing is known beyond his work — for which see YOGA. — The few historical facts relating to the latter, as at present ascertained, may be gathered from his great work, *Mahâbhâshya*, or 'the great commentary.' The name of his mother was Gon'ikâ; his birthplace was Gonarda, in e. India, and he resided temporarily in Cashmere, where his work was especially patronized. From circumstantial evidence, Prof. Goldstücker has, moreover, proved that he wrote between B.C. 140 and 120 (*Pân'ini, his Place in Sanskrit Literature*, 235, ff.). The *Mahâbhâshya* of P. is not a full commentary on Pân'ini, but, with a few exceptions, only a commentary on the Vârttikas, or critical remarks of Kâtyâyana on Pân'ini. P. being the third of the grammatical triad of India (see PÂN'INI), therefore, having the advantage of profiting by the scholarship of his predecessors, is esteemed a paramount authority in classical Sanskrit grammar; and justly, for in learning, ingenuity, and conscientiousness, no grammatical author of India can be held superior to him. The *Mahâbhâshya* has been commented on by Kaiyyat'a, in a work called *Bhâshya-Pradîpa;* and the latter has been annotated by Nagojîbhatta, in the *Bhâshya-pradîpodyota*. So much of these three latter works as relates to the first chapter of the first book of Pân'ini, together with the Vârttikas connected with them, was ed. at Mirzapore 1856, by the late Dr. J. R. Ballantyne.

PATAPSCO, *pa-tăps′kō*, RIVER: in Md.; rising on the n. boundary of the state, and flowing s.e. 80 m. to Chesapeake Bay, 14 m. s. of Baltimore, to which city it is navigable. Its falls furnish water-power to factories.

PATARINI, or PATERINI, *păt-ė-rī′nī* (or PAT′ARINES, PAT′ERINES, PATERENI, PATERELLI, PATARÆI): mediæval sect opposed to the marriage of priests; dating from the 11th c. The name came to be applied to the Cathari, who opposed all marriage. The designation is traced to Pataria, the ragmen's quarters of Milan (*pates*, provincial for rag), where adherents of the party were accustomed to meet, under the leadership of Arialdus, a deacon.

PATCH, n. *păch* [Swiss, *batsch*, the sound of a blow, a patch; *batschen*, to clap on a piece: Gael. *baid*, a rag: It. *pezza*, a piece of rag]: a piece of cloth sewed on to cover a defect or hole; a piece in variegated needlework; a detached piece; a small piece of black plaster formerly placed on the face as an ornament; a plot of ground; in *OE.*, a mean, paltry fellow: V. to mend with a patch or patches; to repair clumsily; to make up of pieces; to make or complete suddenly—followed by *up*, as, to *patch up* a peace. PATCH′ING, imp.: N. act of one who patches. PATCHED, pp. *păcht:* ADJ. mended with a patch or patches. PATCH′ER, n. *-ėr*, one who patches. PATCH′WORK, work formed of pieces sewed together; any parts joined together clumsily. *Note.*—Skeat prefers a derivation from Low Ger. *plakke*, a spot, a piece, a patch, O. Dut. *placken*, to strike, to plaster, to spot, and says the etymology is obscured by the loss of *l*, which is still retained in Scot. *platch*, a large spot, a patch.

PATCH, n. *păch* [Gael. *pait*, a hump, an excrescence]: in *OE.*, a personal deformity, as a hunch or hump; an opprobrious name expressive of ugliness real or supposed, as, she is 'a cross *patch*.' PATCHOKE, n. *păch′ŏk*, and PAJOK, n. *păj′ŏk*, in *OE.*, a little deformed patch. *Note.*—This word, however, may really be connected with PATCH 1, in the sense of the person made up of rags and patches.

PATCHOULI, or PATCHOULY, n. *pă-chô′lĭ* [E. Indian word: Malay, *pucha-pat*]: wild plant of India; also the perfume which it yields. The perfume is derived from the dried branches of *Pogostemon Patchouli* (nat. order *Labiatæ*), introduced into Britain and the west as an article of merchandise 1844. The plant is a native of Silhet, the Malay coast, Ceylon, Java, and the neighborhood of Bombay; probably also of China; but owing to the fondness of Asiatics for its perfume, it is difficult to say where it is native or cultivated. Every part of the plant is odoriferous, but the younger portions of the branches with leaves are chosen—usually about 12 inches long. The odor is peculiar and difficult to define, but has a slight resemblance to sandal-wood; it is very powerful, and to many persons extremely disagreeable.

The odor was known in Europe before the material itself was introduced, through its use in Cashmere to scent the shawls for keeping out moths, which are averse to it; hence the genuine Cashmere shawls were known by their scent, until the French found the secret, and imported the herb for similar use. It is used in India as an ingredient in fancy tobaccoes, and as a perfume for the hair; and is prized for keeping insects from linen and woolen articles. The essence of P. is a peculiar heavy brown oil with disagreeably powerful odor; it is obtained by distillation, and requires extreme dilution for perfumery purposes.

PATE, n. *pāt* [OF. *pate*, a plate or band of iron: Ger. *platte*, a plate, a bald pate, a head: mid. L. *platta*, the clerical tonsure from ear to ear]: the brain-pan; the head. PA′TED, a. having a pate, in composition only, as *long-pated*. *Note.*—The origin of PATE is disguised by the loss of the *l:* OF. *pate* is probably derived from Ger. *platte*. We have Ir. *plata*, a plate; *plait*, the forehead.

PATE, n. *pâ′tā* [F. *pâte*, a pasty]: in *fort.*, a kind of [illegible]form, usually of a roundish shape, erected on marshy ground to cover a gate.

PÂTÉ DE FOIE GRAS, *pâ-tā′ dĕh fwâ grâ* [F., pie of liver fat]: baked preparation of abnormally fattened liver of goose (sometimes duck), seasoned, and usually compounded with truffles. It is made mostly at Strasbourg and Toulouse, France. The geese are kept confined, commonly in the dark, and fed with beans or maize; after 3 weeks, oil of poppy is added, and, 'to prevent corruption,' burned bread in water; sometimes, farina flour and antimony are used. At last, food is forced down the throat of the overfed animal, which can hardly respire. The liver attains the weight of 1 or 2 lbs., and is reported at even 2 kilograms. The inhuman trade is said to amount, at Strasbourg, to half a million of dollars annually.

PATEE, n., or PATTEE, n. *pă-tē′* [F. *patté*—from *patte*, a paw]: in *her.*, a small cross with the arms widening toward the ends, and flat at their outer edges; called also *Cross Formée.*

PATELLA, n. *pă-tĕl′lă* [L. *patella*, a small pan: It. *padella*, a frying-pan; *patella*, the knee-pan]: in *anat.*, the knee-pan, or cap of the knee (see below): the Limpet (q.v.): a small vase: in *bot.*, an orbicular sessile apothecium of a lichen, with a marginal rim distinct from the thallus. PATEL′LIFORM, a. *-lĭ-fawrm* [L. *forma*, a shape]: in the form of a small dish or saucer; knee-pan-shaped. PATELLA and PATELLIDÆ: see LIMPET.

PATEL′LA, or KNEE′-CAP: a Sesamoid Bone (q.v.), developed in the single tendon of the *rectus*, *vastus externus*, and *vastus internus* muscles—the greater extensor muscles of the leg. It is heart-shaped in form, the broad end

directed upward, and the apex downward. The anterior or external surface is convex, perforated by small apertures for entrance of vessels, and marked by rough longitudinal striæ; while the posterior or internal surface is smooth and divided into two facets by a vertical ridge, which corresponds and fits into the groove on the lower articulating surface of the femur or thigh-bone; while the two facets (of which the outer is the broader and deeper) correspond to the articular surface of the two condyles.

This bone is liable both to dislocation and to fracture. Dislocation may occur either inward or outward; but it is most frequent outward. The displacement may be caused either by mechanical violence, or by too sudden contraction of the extensor muscles in whose conjoined tendon it lies; and is most liable to occur in knock-kneed, flabby persons. It may be readily detected by the impossibility of bending the knee, and by the bone being felt in its new position; and, except in one rare variety, the dislocation is capable of being reduced without difficulty. Fracture of the P. may (like dislocation) be caused either by muscular action or by mechanical violence.

Fig. 1.—Posterior surface of right Patella:
1, outer facet; 2, inner facet; 3, surface to which the ligamentum patellæ is attached.

Fracture by muscular action is the more common of the two forms, and occurs thus: A person in danger of falling forward attempts to recover himself by throwing the body backward, and the violent action of the extensors (chiefly the *rectus*) snaps the P. across, the upper fragment being drawn up the thigh, while the lower portion is retained *in situ* by that portion of the common tendon which is continued from the P. to the tubercle of the tibia, and which is called the ligamentum patellæ. The treatment consists in relaxing the opposing muscles by raising the trunk, and slightly elevating the limb, which should be kept in a straight position. Because of the great difficulty of bringing the broken surfaces into exact apposition, as may be readily understood from the accompanying figure, it is very difficult to obtain bony reunion of the parts, and the case generally results either in mere ligamentous union or in no true union at all.

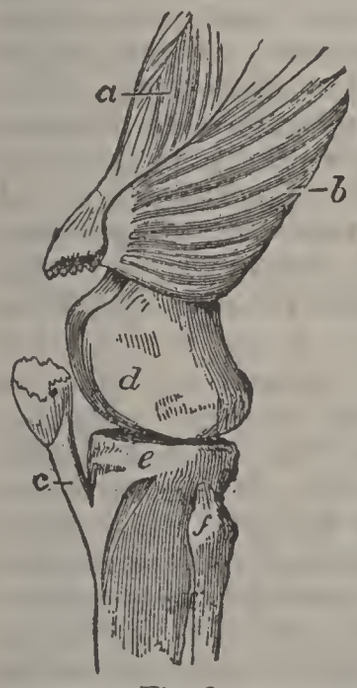


Fig. 2.
a, *rectus* muscle; *b*, *vastus externus* muscle; *c*, ligamentum patellæ; *d*, external condyle of right femur; *e*, head of tibia; *f*, head of fibula.

PATEN, n. *păt'ĕn*, or PATIN, n. *păt'ĭn* [OF. *patene*, the paten or cover of a chalice—from mid. L. *patena*, the paten in the Eucharist—from L. *patĭna*, a wide shallow basin: It. *patena*]: in genĕral, a plate or sheet, as *patens* of bright gold. P., in *eccles.*, is the plate employed for the element of bread in the eucharistic service. Anciently it was of considerable size; and while the practice of the OFFERTORY (q.v.) continued, there was a special P. for the bread-offering. In the Rom. Cath. Church, in which the unleavened wafer-bread is used, and the communion is distributed from a distinct vessel called PYX (q.v.), the P. is a small circular plate, always of the same material with the chalice, and often richly chased or carved, and studded with precious stones. It is used only in the mass.

PATENT, a. *păt'ĕnt* or *pātĕnt* [F. *patent*, patent, evident—from L. *patens* or *paten'tem*, lying open: It. *patente*]: open; unconcealed; open to the perusal of all; protected by special privilege, as by *letters patent:* in *bot.*, spreading widely; expanded: N. a writ from the govt., so called from its being *open* to the perusal of all, and conferring a certain exclusive right or privilege—e.g. (in monarchical countries), a title of nobility; or (in general) the possession or use of a certain territory, or the sole right to a new invention or discovery for a certain time (see PATENTS, LAW OF: PATENT OFFICE): V. to secure by patent. PAT'ENTING, imp. PAT'ENTED, pp. PAT'ENTABLE, a. *-ă-bl*, that may be secured or protected by patent. PATENTEE, n. *păt'ĕn-tē'*, one to whom a certain privilege is secured by law. PATENT MEDICINE, medicine the composition of which is a secret, and the right of sale limited by govt. sanction to the proprietor. PATENT OFFICE, govt. office for issuing patents (see PATENT OFFICE). PATENT RIGHT, an exclusive right to the use of an invention, conferred by govt. for a certain term of years. PATENT ROLLS, records or registers of patents. PATENT-YELLOW, pigment or paint composed of oxide and chloride of lead. LETTERS PATENT: see PATENTS, LAW OF: LETTER.

PATENT OFFICE, *păt'ĕnt of'fĭs:* bureau or dept. of government at Washington, instituted for the granting of letters patent for inventions. In the United States the patent office is a branch of the dept. of the interior; its head is styled commissioner of patents. The force consists of a Commissioner, an assistant Commissioner, 166 examiners, including 39 principal examiners, 1 examiner of interferences, 3 examiners-in-chief and 223 assistant examiners of various grades. The entire force including clerks, stenographers, messengers and consist of 722 persons. The business of the office shows a large annual clear profit. The receipts for the year ending Dec. 31, 1904, reached $1,687,326.53. The expenditures amounted to $1,476,000.38. The number of patents applied for during 1904 was 51,168; number granted, 30,934. The number of patents issued in the United States up to 1870 was 120,573; between 1870 and 1904, 668,217. There is a balance in the United

States treasury of over $5,000,000 to the credit of the patent office, this amount having accumulated from an average annual surplus of $150,000. This cannot be expended by patent office or other officials, as Congress only grants enough yearly to pay running expenses.

Patents are issued to any person who has invented or discovered any new and useful art, machine, manufacture, or composition of matter or any new and useful improvement thereof, or any new original and ornamental design for an article of manufacture, not known or used by others in this country before his invention or discovery thereof, and not patented or described in any printed publication in this or any foreign country, before his invention or discovery thereof or more than two years prior to his application, and not in public use or on sale in the United States for more than two years prior to his application, unless the same is proved to have been abandoned; upon payment of the fees required by law and other due proceedings had. Every patent contains a grant to the patentee, his heirs or assigns, for the term of seventeen years, except in the case of design patents, of the exclusive right to make, use, and vend the invention or discovery throughout the United States and the territories, referring to the specification for the particulars thereof. If the inventor, at the time of making his application, believed himself to be the first inventor or discoverer, a patent will not be refused on account of the invention or discovery, or any part thereof, having been known or used in any foreign coutry before his invention or discovery thereof, if it had not been before patented or described in any printed publication. Joint inventors are entitled to a joint patent; neither can claim one separately. Independent inventors of distinct and independent improvements in the same machine cannot obtain a joint patent for their separate inventions, nor does the fact that one furnishes the capital and another makes the invention entitle them to make application as joint inventors; but in such case they may become joint patentees. No person otherwise entitled thereto will be debarred from receiving a patent for his invention or discovery, by reason of its having been first patented or caused to be patented by the inventor or his legal representatives or assigns in a foreign country, unless the application for such foreign patent was filed more than twelve months prior to the filing of the application in this country, and four months in cases of designs, in which case no patent shall be granted in this country.

Applications for a patent are made in writing to the commissioner of patents. The applicant must also file in the patent office a written description of the invention or discovery, and of the manner and process of making, constructing, compounding, and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art or science to which it appertains, or with which it is most nearly connected, to make, construct, compound, and use the same; and in case of a machine, he must explain the prineiple thereof, and the best mode in which he

has contemplated applying that principle, so as to distinguish it from other inventions, and particularly point out and distinctly claim the part, improvement, or combination which he claims as his invention, or discovery. The specification and claim must be signed by the inventor and attested by two witnesses. When the nature of the case admits of drawings, the applicant must furnish a drawing of the required size, signed by the inventor or his attorney in fact, and attested by two witnesses. In all cases which admit of representation by model, the applicant, if required by the patent office, shall furnish a model of convenient size to exhibit advantageously the several parts of his invention or discovery. The applicant shall make oath that he verily believes himself to be the original and first inventor or discoverer of the art, machine, manufacture, composition, or improvement for which he solicits a patent; that he does not know and does not believe that the same was ever before known or used, and shall state of what country he is a citizen and where he resides. In every original application the applicant must distinctly state under oath that the invention has not been patented to himself or to others, with his knowledge or consent in this or any foreign country for more than two years prior to his application, or on an application for a patent filed in any foreign country by himself or his legal representatives or assigns more than twelve months prior to his application in this country, or four months in cases of designs.

If the application for patent has been filed in any foreign country by the applicant in this country or by his legal representatives or assigns, prior to his application in this country, he shall state the country or countries in which such application has been filed, giving the date of such application, and shall also state that no application has been filed in any other country or countries than those mentioned; that to the best of his knowledge and belief the invention has not been in public use or on sale in the United States nor described in any printed publication or patent in this or any foreign country for more than two years prior to his application in this country. Such oath may be made before any person within the United States authorized by law to administer oaths, or, when the applicant resides in a foreign country, before any minister, charge d'affaires, consul, or commercial agent holding commission under the government of the United States, or before any notary public of the foreign country in which the applicant may be, provided such notary is authorized by the laws of his country to administer oaths. On the filing of such application and the payment of the fees required by law, if, on examination, it appears that the applicant is justly entitled to a patent under the law, and that the same is sufficiently useful and important, the commissioner will issue a patent therefor. Every patent or any interest therein assignable in law by an instrument in writing; and the patentee or his assigns or legal

representatives may grant and convey exclusive right under his patent to the whole or any specified part of the United States.

A reissue is granted to the original patentee, his legal representatives, or the assignees of the entire interest when, by reason of a defective or insufficient specification, or by reason of the patentee claiming as his invention or discovery more than he had a right to claim as new, the original patent is inoperative or invalid, provided the error has arisen from inadvertence, accident, or mistake, and without any fraudulent or deceptive intention. Reissue applications must be made and the specifications sworn to by the inventors, if they be living.

A caveat, under the patent law, is a notice given to the office of the caveator's claim as inventor, in order to prevent the grant of a patent to another for the same alleged invention upon an application filed during the life of a caveat without notice to the caveator.

Any person who has made a new invention or discovery, and desires further time to mature the same, may, on payment of a fee of $10, file in the patent office a caveat setting forth the object and the distinguishing characteristics of the invention, and praying protection of his right until he shall have matured his invention. Such caveat shall be filed in the confidential archives of the office and preserved in secrecy, and shall be operative for the term of one year from the filing thereof. The caveat may be renewed, on request in writing, by the payment of a second fee of $10, and it will continue in force for one year from the payment of such second fee.

Fees must be paid in advance, and are as follows: On filing each original application for a patent, $15. On issuing each original patent, $20. In design cases: For three years and six months, $10; for seven years, $15; for fourteen years, $30. On filing each caveat, $10. On every application for the reissue of a patent, $30. On filing each disclaimer, $10. For certified copies of patents and other papers in manuscript, 10 cents per hundred words and 25 cents for the certificate; for certified copies of printed patents, 80 cents. For uncertified printed copies of specifications and drawings of patents, for single copies, or any number of unclassified copies, 5 cents each; for copies by subclasses, 3 cents each; by classes, 2 cents each. For recording every assignment, agreement, power of attorney, or other paper, of 300 words or under, $1; of over 300 and under 1,000 words, $2; of over 1,000 words, $3. For copies of drawings, the reasonable cost of making them. The patent office is prepared to furnish positive photographic copies of any drawing, foreign or domestic, in the possession of the office, in sizes and at rates as follows: Large size, 10 x 15 inches, 25 cents; medium size, 7 x 11 inches, 15 cents. Fee for examining and registering trade mark, $10, which includes certificate. Stamps cannot be accepted in payment of fees. See PATENTS, LAW OF.

In England, in accordance with the law of 1852, all

the specifications of patents from the earliest date were examined, and minutely classified according to their contents. The patents 1711–1852 were found to amount to 12,977; and the specifications of the whole of these were printed between 1853–58. The whole fill many hundred quarto vols., with the lithographed illustrations bound in separate folio vols. The next work was to utilize this immense collection by a thorough system of indexing. Three indexes were prepared—*Chronological*, *Alphabetical* (according to the names of the inventors), and *Subject-matter*. Arrangements were at the same time made for printing and indexing the specifications of all patents obtained under the new law. These specifications are sold to the public at the price of paper and print. In 1871 the plan was adopted of publishing weekly abridgments of the specifications of new patents; dispensing with any further alphabetical and subject-matter indexes. Besides this, abridgments have been drawn up of most of the specifications, and will be eventually of all; setting forth, in few words, the general nature of the invention. These abridgments are collected into 12mo vols., one or more to each class of subjects; and the vols. are sold at 6*d.* to 10*s.* each, according to their bulk. At the end of 1878, there were 115 vols. of these useful works, relating to no less than 94 groups or classes of abridgments. By reference to one of these handy vols., or to the *Subject-matter* index, an inventor can see whether any person has preceded him in the particular subject for which he desires a patent.

The commissioners having come into possession, by gift and otherwise, of several models illustrating patented inventions, and having no place to deposit them for preservation and exhibition, an arrangement was made with the authorities at South Kensington, London, for the reception of these models; and, greatly augmented by specimens, drawings, diagrams, and portraits, the Patent Museum now occupies a site adjacent to the South Kensington Museum.

PATENTS, LAW OF: body of customary or of statute law regulating the grant to an individual by govt., in letters *patent* or open (whence the name), of the exclusive right to manufacture and sell a chattel or article of commerce to which he has a claim by reason of invention. In the common law of England, a patent originally was a written instrument emanating from the king, sealed with the great seal, and conferring grants of lands, honors, franchises, or monopolies. Thus, exclusive right to deal in certain commodities, e.g., salt, was conferred on individuals, either gratis as a royal favor, or for a fixed percentage of the profits, or even for a sum in hand. In Magna Charta the king's power of granting such monopolies was to some extent restricted, and the parliament subsequently placed further restrictions on the exercise of this prerogative by the crown. Nevertheless, monopolies continued to be granted until the

21st year of James I. (1623), when the 'statute of monopolies' was enacted, totally prohibiting all grants of monopoly rights so far as traffic in commodities already known was concerned; but at the same time the king was permitted to grant to the inventor of any new manufacture the exclusive right of making and selling it for not exceeding 14 yrs. That act may be regarded as the beginning of legislation on what are now known as patent rights.

Prior to independence, the govts. of the British colonies in N. America sometimes granted letters patent to inventors: this was done by the Mass. general court 1641; a statute of Conn. provided for granting patents 1652. The 8th sec. of Art. I. of the U. S. constitution concedes to congress power 'to promote the progress of science and useful arts, by securing for limited times to authors and inventors the exclusive right to their respective writings and discoveries.' This is the basis of all our laws of copyright and patent. See COPYRIGHT. Congress enacted the law establishing the patent office 1790; it has since been many times supplemented and amended, then annulled and superseded by new statutes. At present the law provides for the granting of letters patent to the first discoverer or inventor of any new and useful art, machine, manufacture, or composition of matter, or of any new and useful improvement of an existing art, machine, etc., if such invention or discovery has not been known or used by others in this country, nor been patented abroad, nor described in any printed publication in this or any foreign country before his invention or discovery, nor 'been in public use or on sale for more than 2 yrs. before the date of the application.' The law does not cover discoveries of scientific theories or philosophical principles, or of laws of nature, but only the reduction of these to practice, and their embodiment in a particular structure or combination of parts. The invention must be *useful*, i.e., promotive of beneficial ends, as distinguished from ends that are trivial, or contrary to the general welfare. A mere application of an old device or of an already existent material that involves no new device, or manufacture, or combination of materials, is not patentable: thus, if one cuts common writing-paper into the form of a shirt-collar, the result is not patentable; but if he contrives a new machine for cutting paper into shapes suitable for collars, or one for molding paper-pulp into such shapes, his contrivance may be patented. The inventor of a device that has been patented in a foreign country may obtain a like patent in the United States, provided the device 'shall not have been introduced into public use here for more than 2 yrs. prior to the application' for a patent; such patent expires at the expiry of the foreign patent, or, if there be more than one, then at the same time with the one that has the shortest time to run; no such patent runs for a longer term than 17 yrs.

An inventor may enter at the patent office a 'caveat'—

a statement or description of his invention--and that will give him for one year prior right to a patent over any other applicant for letters patent on the same subject-matter. The caveat is a confidential communication to the patent office. The petition for a patent must describe clearly and fully the nature of the invention, its different parts, its features of novelty, etc. Whenever drawings or models are of use for a full description, they must be entered with the petition. The petitioner is entitled to a patent on proving himself to be the original author of the invention, with this one proviso, that he has not, either actually or constructively, abandoned his invention to the public. The law provides for renewed application when a patent is denied by the commissioner, and gives the right of presenting an amended petition. When an unintentional error exists in the specification of a patent, whereby it is rendered wholly or partially invalid, a new patent may be issued; this expires when the original paper would have expired. The life of a patent extends through 17 years, and it is not renewable except by act of congress. The article patented must bear the word 'patented,' with day and year of grant of patent, either stamped or affixed to itself, or, when that is not practicable, upon an envelope containing it, etc.; a penalty attaches to the use of such stamp or label where no patent has been granted. Damages for infringement are recoverable in any circuit court of the United States, but actual damages only can be recovered, not exemplary, vindictive, or punitive. The letters patent do not guarantee the validity of the title conferred on the patentee; but they are *prima facie* evidence of validity. The law makes no provision for the annulment of a patent, however invalid it may prove; but a recent judgment of the federal supreme court shows the proper remedy in such case to be a suit by the atty.gen. on *the relation* of the party interested. See PATENT OFFICE.

In Great Britain, since 1883, the Law of Patents has been greatly simplified. The new responsible official, the comptroller of patents, is an officer of the board of trade—from whose decisions there is in certain cases an appeal to a court comprising some of the chief law officers of the crown. There is a paid examiner of patents, to whom applications are first submitted. One application suffices, and that may be sent through the mail. Charges under the new law are: £1 paid at once, when the provisional specification is lodged at the patent office; £3 more after nine months, when the final specification is passed by the comptroller, and sealed; £50 after the fourth year; and £100 after the ninth. The latter two payments may be in annual instalments. The present law allows the inventor a monopoly of his invention for 14 years, with privilege at the end of that time—if he has not been sufficiently remunerated—to have the patent renewed for a further term of 14 years. British patents are valid only in the home jurisdictions; nearly all the colonies have patent laws of their own. The life

of a patent is 15 yrs. in Canada, France, Austria, Italy, Portugal, Sweden, Brazil ; 20 yrs. in Belgium ; 10 yrs. in Norway and Russia. The conditions of obtaining a patent vary widely in the different countries : for details, see Johnson's *Patentee's Manual*, an Eng. publication.

PATER, *pā'tėr*, WALTER HENRY ; 1839—1894, July 30 ; b. London : author and art critic. He graduated at Oxford, 1862 ; was elected fellow of Brasenose college, 1862 ; at his death was dean and lecturer of the same. His chief works were *The Renaissance* (1873) ; and later *Marius the Epicurean*, and *Imaginary Portraits*. He wrote also numerous essays. He was of the school whose motto is "art for art's sake" to the exclusion of moral purpose.

PATERA, *păt'ē-râ* [L.] : round dish, imitations of which were carved by the Romans in the panels of ceilings, etc.

Patera.

The name is applied also to the foliated ornaments used in the same position.

PATERCULUS, *pa-tėr'kū-lŭs*, C. VELLEIUS : Roman historian : born about B.C. 19 ; died after A.D. 30. He served under Tiberius as prefect or legate in Germany, Pannonia, and Dalmatia ; and A.D. 14 was appointed prætor. P.'s claim to remembrance is his *Historiæ Romanæ*, a compendium of universal, but particularly of Roman, history, in two books. The work, as we have it, is not complete ; the beginning, and a portion following the 8th chapter, are lacking. The work is, on the whole, impartial and discriminating ; its style is based on that of Sallust. The *editio princeps* appeared at Basel 1520.

PATEREROS, *păt-ē-rē'rŏs :* small pieces of ordnance, now obsolete, worked on swivels ; commonly used on board ships, where, mounted on the gunwale, they discharged showers of old nails, etc., into hostile boats.

PATERFAMILIAS, n. *pā'tėr-fă-mĭl'ĭ-ăs* [L.—from *pater*, a father ; *familĭă*, a household, a family] : the familiar name for a male parent or master of a family—the mother being called *materfamilias*.

PATERI'NI (PAT'ERINES) : see PATARINI.

PATERNAL, a. *pă-tėr'năl* [F. *paternel*, fatherly—from mid. L. *paternālis*—from L. *pater*, a father : It. *paternale*] : pertaining to or derived from a father ; fatherly ; hereditary. PATER'NALLY, ad. *-lĭ*. PATER'NITY, n. *-nĭ-tĭ*, the relation or condition of a father ; fathership.

PATERNO, *pâ-tėr'nō* (anc. *Hybla Major*) : town of Catania, Sicily, 11 m. n.w. from Catania. Pop. 15,000.

PATERNOSTER, n. *păt'ėr-nŏs'tėr* or *pā'tėr-* [L. *pater*, father; *noster*, our]: the LORD'S PRAYER, in its Latin name; short form of prayer prescribed by the Lord Jesus to his disciples (Matt. vi. 9–13; Luke xi. 1–4) as the model according to which, in contrast with the prayers of the Pharisees and of the heathen, they were to pray. *The Lord's Prayer* (its Latin name is not used by Protestants) has been accepted as, by excellence, the form of Christian prayer. It had a place in all the ancient liturgies. So sacred, indeed, was the use of the P., that it was reserved from pagans and catechumens under what is known as the Discipline of the Secret. The early fathers—Origen, Tertullian, Cyprian—refer to it in terms which show that even then it was a recognized form of private prayer. It was recited in baptism, and one of the privileges of the baptized was the use of the P. More than one of the Fathers, and very many later writers, have devoted special treatises to the exposition of this prayer, as embracing all the fitting and legitimate objects of the prayer of a Christian. The Catechism of the Council of Trent contains a detailed exposition and commentary of it, and in all the services, not only of the Roman Missal, Breviary, Ritual, Processional, and Ordinal, but in all the occasional services prescribed from time to time, it is invariably introduced. In the Rosary (q.v.) of the Virgin Mary, it is combined with the Hail Mary; whence the larger beads of the 'Rosary' are sometimes called *Paternosters*, and the name is applied sometimes to the whole Rosary. Perhaps the most usual of the shorter devotions among Rom. Catholics is the recitation of the 'Pater,' with one or more 'Ave Marias,' concluding with the Doxology. The P. as commonly used by Protestants concludes with the clause, 'for Thine is the kingdom, and the power, and the glory for ever [and ever]. Amen.' This clause is not used by Rom. Catholics. Of the two gospels—of Matthew and of Luke—in which the prayer is contained, that of Luke has not this clause; and even in the Gospel of Matthew the clause is found only in the later MSS., in which it cannot be doubted that it is a modern interpolation. It was retained, however, in Luther's German translation and in the Authorized English Version, whence its use has become common among Protestants. Many polyglot collections of the P. have been published since the 16th c., the most remarkable of which are those of John Chamberlayne in 150 languages (1715), of Conrad Gesner in 200 (1748), and of Padre Hervaz in 307 (1787).

PA'TERNOS'TER ROW: street in London, near St. Paul's Cathedral; occupied principally by booksellers.

PATERSON.

PATERSON, *păt' er-son,* New Jersey, city, capital of Passaic co., third in size and importance among the cities of the state; on the Passaic river, 17 m. n.w. of New York. It has exceptional railroad facilities, by the Erie railroad directly through the city, with more than 50 trains daily each way; the New York, Susquehanna & Western skirting the e. boundary, and the Delaware, Lackawanna & Western the w. boundary, each with a spur into the heart of the city. The Morris and Essex canal, from Easton, Pa., to Jersey City, gives it connection with the Delaware river. From the Passaic river, the entire fall of which within the city is 80 ft., immense water power is obtained, with a centre at the great falls, where the direct descent is 50 ft. Below the falls the channel, with its vertical walls of basalt, in connection with the beautiful cataract at its head, gives picturesque and striking scenery. P. is at the point where the river breaks through the Orange Mountains, covers a broad plain whose altitudes are 393 ft. on the w. side, 98 ft. in the natural basin occupied by the older and business portions, and 32 ft. at the lowest. The better residence quarter is beautifully situated on the higher ground, with shaded streets, fine houses, and a fine outlook. For a long period the owners of the water power at the falls have maintained in its immediate vicinity a beautiful park open to all.

In the abundant power afforded by this waterfall is found the reason for founding the city at this point, and its growth to one of the most important manufacturing centres of the country. A large number of bridges span the channel of the Passaic, and the city has about 170 m. of streets, averaging 60 ft. in width, the principal of which are either well paved or finely macadamized. About 6 miles of the more important streets are paved with vitrified brick, 3½ with asphalt, and 4½ with 'Belgian block.'

History.—The town of Paterson was founded by, or had its origin in the 'Society for Establishing Useful Manufactures,' which was chartered by the legislature of New Jersey in 1791, and in the summer of 1792 the site, by the 'Great Falls of the Passaic' was fixed upon as the location for the mills and the town. The charter of the society was drawn up by Alexander Hamilton, who was greatly interested in founding a system of American manufactures. He has often been considered the founder of P., and there is evidence that he influenced the newly-formed corporation in selecting the site for the town, but he appears to have had little connection with the enterprise afterward. Cotton manufactures were the first, and for many years the most important carried on, but have long since been superseded. Woolen and paper manufactures were also extensively carried on in the early and middle part of the last century, and it was in P. that Samuel Colt manufactured the first of his revolving pistols. His

venture there, however, was not a success. The first locomotive manufactured in Paterson was finished in 1837, after 16 months' labor upon it. It was not until 1840 that the silk industry was successfully established by John Ryle, a young Englishman who had recently come to this country. From very modest beginnings this industry has advanced in 60 years to vast proportions. At midnight on Saturday, Feb. 8, 1902, a fire broke out in the lower part of the city west of Main street, and rapidly burned its way through the very heart of the business section of the town. The fire was not subdued until Sunday night. The Public Library, two bank buildings, five churches, the largest stores and other prominent buildings and about 250 dwellings were destroyed. The City Hall and the Hamilton Club, two of the best buildings in the city, were burned out, but the walls were left intact and the exteriors not seriously damaged. The total loss was $6,000,000, on which insurance was paid to the amount of $4,011,000. Mayor Hinchliffe declined all outside aid, the citizens raised a large fund for the relief of the destitute, and immediately set to work to rebuild the city far better than before. In less than a month another calamity came upon the city in the shape of the greatest flood ever known in the Passaic Valley. Great loss of property followed in P., and hundreds of the poorer class were again driven from their homes. In October, 1903, another great flood occurred, causing heavy loss, but from this also the city quickly recovered.

Industries.—Because of its great silk manufacturing industry, P. is called 'the Lyons of America.' It is the principal silk manufacturing centre of the Western Hemisphere. According to the latest census reports, the silk mills in P. numbered 136, with a total capital of more than $19,000,000, employing nearly 16,000 wage-earners, whose total annual wage amounted to nearly $6,300,000. The value of the product of these mills was in excess of $26,000,000. There are also some 30 establishments engaged in dyeing and finishing textiles—almost exclusively silk—with combined capital of about $3,000,000, employing 3,000 workers, whose wages amount to more than $1,300,000. The total product of the dyeing establishments is more than $4,000,000. The total annual product of the silk manufacturing business, including dyeing and finishing, amounted, in 1900, to fully $30,000,000; this being more than half the total value of manufactured goods of all kinds produced in the city, and it is expected that the next census reports will show a material advance in this industry. Steel and iron manufactures rank second in importance. There were in this line 37 establishments with capital amounting to nearly $6,700,000, employing about 4,000 wage-earners who received approximately $2,000,000 in wages. The value of the product was nearly $6,000,000. This industry has also about doubled its operations since the

last census was taken. The greatest part of the steel and iron business is done by the great corporations engaged in the manufacture of locomotives, structural iron, and large machinery. The city was one of the earliest to engage in the manufacture of locomotives and has always ranked among the most important centres in the country for this industry. Brewing ranks fourth in the value of annual products, and there are a large number and great variety of other industries, including 9 shirt factories, the largest thread manufactories in the world, one of the largest jute twine factories in the country, and several plants for the manufacture of tools and plumbers' materials. The decade ending in 1900 showed an increase of over 66 per cent. in the number of establishments, and 23 per cent. in value of products, and it is believed that the growth of P. during the last decade has been about as great. According to the Paterson Board of Trade, the industrial interests in 1909 were as follows: Number of establishments, 538; number of wage-earners, 31,000; total amount of wages, $14,000,000; value of raw materials, $28,500,000; value of annual products, $59,393,660.

Banks.—There are three national banks, with combined resources of $10,610,650, and total deposits of $7,500,000, and six savings banks and trust companies. The oldest of these, the Paterson Savings Institution, has deposits of more than $12,000,000.

Government.—The city government comprises a mayor, elected for two years, a board of aldermen, commissioners of public instruction, park commissioners, commissioners of assessment of taxes, board of health, and public library trustees. The commissions are appointed by the mayor, but one or two are confirmed by the board of aldermen. The tax rate is $1.71 per $100; total valuation, $95,243,359.

Education.—The public school system is most efficient and progressive. There are 24 public schools (including a high school) and 472 class rooms. The number of pupils registered is 17,349, and the number of teachers employed, 476. The annual expenditure for educational purposes is about $762,000. There are also 16 private schools, with an average attendance of 6,000; 5 business colleges, and 2 technical schools. The value of public school property is approximately $2,000,000.

Libraries.—The Free Public Library is managed on progressive lines and its popularity is shown by its annual circulation of 150,000 volumes (including its 2 branch libraries). The building and all except some 3,000 of its 36,000 volumes were destroyed in the fire of 1902, but the collection has been re-established in an attractive building erected at a cost of more than $200,000.

Newspapers.—There are published in P. five daily newspapers and twenty weekly papers and periodicals.

Parks and Cemeteries.—P. has two parks of moderate area, but well kept, presenting pleasing examples of landscape gardening, and affording somewhat exceptionally picturesque and charming distant views. They are situated one at either end of the town and both border on the Passaic river. The Eastside Park contains 60 acres and the Westside 30 acres. Also situated one at the e., the other at the w. side of the town, are two cemeteries, beautifully laid out. In Cedar Lawn Cemetery is the costly mausoleum of the late Hon. Garret A. Hobart, Vice-President of the United States.

Churches and Charitable Institutions.—There are upward of 80 churches in P., representing nearly all the principal denominations. The most prominent are the Presbyterian, Episcopalian, Methodist Episcopal, Reformed and Roman Catholic. There are also three Jewish synagogues. There are a flourishing Y. M. C. A. and Y. W. C. A., each with a handsome building. There are two large and well-supported hospitals—the General Hospital and Saint Joseph's—also an isolation hospital for contagious diseases and an eye and ear infirmary; two orphan asylums, three homes for aged poor, two children's day nurseries, and a home for boys.

Public Buildings.—Main street contains large and handsome department stores of metropolitan character and appointments. The new County Court House is built of white marble at a cost of about $400,000. Adjoining the Court House is the new Postoffice. One block to the e. of the City Hall stands the Hamilton Club, the handsomest club house in New Jersey. The Danforth Memorial Library building is perhaps the most notable and beautiful public building in the city. It was erected in 1903-4 as a memorial to the late Charles Danforth, with funds presented to the Public Library trustees by his daughter, Mrs. Mary E. Ryle.

Pop. (1840) 7,596; (1850) 11,334; (1860) 19,586; (1870) 33,579; (1880) 51,031; (1890) 78,347; (1900) 105,171; (1910) 125,600.

PAT'ERSON, WILLIAM: most celebrated, after John Law (q.v.), of the commercial schemers of the 17th c.: 1658, April—1719, Jan. 22; b. in the parish of Tinwald, Dumfriesshire, Scotland. His early career is obscure, but before he was 30 years old he was a merchant, dealing with the W. Indies and other countries. It was he who first projected the Bank of England (incorporated 1694), and he was one of the original directors. He is known most, however, in connection with the famous Darien Scheme (q.v.), of which he was prime mover, and which obtained the royal sanction 1695. This project came to ruin in a few years; but the scheming activity of P. continued unabated. When in 1701 King William resolved to carry the contest with Louis XVI. into the heart of Spanish America. P. was taken into the king's confidence, and, but for that

monarch's death, might have seen his dreams of Darien realized. He had a considerable hand in the union of Scotland with England, and was elected to the first united parliament by the Dumfries burghs. By a special act of parliament 1715, he was awarded £18,241 as indemnity for his losses by the Darien Scheme; but he did not live long to enjoy it. Paterson was a magnificent commercial schemer, evincing not only ingenuity, but surprising forecast and a solidly practical sagacity—even though his greatest scheme came to naught. That very scheme, however, has its revival in the present undertaking of the Darien canal.—See *W. Paterson*, by S. Bannister (1858); *The Birthplace of W. Paterson*, by W. Pagan (1865).

PATERSON, William: American jurist: b. at sea 1745; d. Albany, N. Y., 1806, Sept. 8. He was brought to America by his parents when a child, was gradnated from Princeton in 1763, admitted to the bar in 1769 and engaged in practice in New Jersey. In 1776 he was a delegate to the New Jersey State constitutional convention and was appointed attorney-general of the state in that year, which office he held for ten years. He was a delegate to the Continental Congress in 1780–1, and in 1787 a member of the National constitutional convention, where he proposed the 'New Jersey plan,' which was to leave in the hands of the 'sovereign states' practically all laws excepting those concerned with regulating commerce, levying duties, and providing the means of war. There was to be one legislature, in which each state should have one vote, and all executive and judiciary committees were to be removable by Congress. This plan was opposed by Edmund Randolph, who presented the plan for a national government, and ultimately the two plans were merged in one and adopted. He was United States senator from New Jersey 1789–90, governor of New Jersey 1791–3, and was appointed by Washington associate justice of the supreme court in 1793. The city of Paterson, N. J., was named in his honor, and his letters have been published and edited by Mills, entitled *Glimpses of Colonial Society and the Life of Princeton College* 1766–1773, *by One of the Class of* 1763 (1903).

PATH, n. *pâth*, plu. *pâthz* [AS. *pœth;* Dut. *pad;* Ger. *pfad*, a path; Gr. *patos*, a trodden way: Skr. *patha*, a way; *pada*, the foot]: a way trodden or beaten by the feet of men or beasts; any narrow way or by-way; a course; a road; a passage; a track; course of life: v. in *OE.*, to walk; to go forth. Pathless, a. *pâth'lĕs*, untrodden. Path'way, n. *-wā*, a narrow way to be walked on; a road.

PATHAN, n. *pă-tân':* an Afghan; an Indian Mussulman of Afghan origin.

PATHETIC, a. *pă-thĕt'ĭk*, or Pathet'ical, a. *-ĭ-kăl*

[Gr. *pathētīkos*, liable to suffering—from *pathos*, suffering: F. *pathétique*]: affecting or moving such passions as pity, sorrow, or grief. PATHET'IC, n. the style or manner of language or music adapted to awaken the passions of pity, sorrow, or grief. PATHET'ICALLY, ad. *-lĭ*. PATHET'ICALNESS, n. *-nĕs*, the quality of being pathetic.

PATHOGENETIC, a. *păth'ōjĕn-ĕt'ĭk* [Gr. *pathos*, suffering; *gennāō*, I produce]: producing disease, or relating to the production of disease. PATHOGENY, n. *pă-thŏj'ĕ-nĭ*, the study of the origin of disease.

PATHOGNOMONIC, a. *pă-thŏg'nō-mŏn'ĭk* [Gr. *pathos*, suffering; *gnōmōn*, one that knows]: designating that which is inseparable from a disease; distinctive. PATHOGNOMY, n. *pă-thŏg'nŏ-mĭ*, the science of the signs by which the passions are indicated.

PATHOLOG'ICAL ANATOMY: anatomy of diseased organs: including in, but not to be confounded with, Pathology (q.v.), as was often done till recent years. It is merely a section—though a most important section—of pathology. Pathological anatomy enables the surgeon to decide whether a suspicious tumor is malignant or comparatively harmless; and in many other ways it is of the greatest importance to surgery; and of no small importance even to Therapeutics. Scientific treatment necessarily demands an accurate knowledge of the material changes which lie at the foundation of the various morbid symptoms. Hence pathological anatomy not only forms a portion of the positive basis of therapeutics, but also points out the processes by which the different altered parts may be gradually restored to their normal condition. It not merely indicates what requires healing, but in many cases also the course requisite to aid the curative tendency of nature.

PATHOLOGY, n. *pă-thŏl'ŏ-jĭ* [Gr. *pathos*, suffering; *logos*, discourse]: department of medicine which treats of the nature of diseases and their causes and symptoms. In treatises written in English, the term is usually so far restricted as not to include the causes, treatment, etc., of diseases; but most French and German writers regard it as equivalent to 'the Theory and Practice of Medicine,' and consider it as treating not only of the classification, causes, symptoms, and physical signs of diseases, but as also including their seat, the phenomena which precede and follow them, their progress, their duration, their modes of termination, the different forms in which they occur, their complications, the changes to which they give rise in the solids and fluids of the body, and their treatment. Although human pathology in its broadest sense comprehends the entire science of medicine, as distinguished from the practice of the medical art, the term is sometimes used in a re-

stricted sense as equivalent to pathological anatomy, the knowledge of which first placed pathology upon a scientific foundation. This knowledge is obtained by post-mortem examinations and by mieroscopical study of diseased tissues (pathological histology). But not less important than the knowledge of morbid structure is that of the altered activities or functions of the body in disease. This latter branch of pathology, which is called pathological physiology, rests upon clinical observations and upon experiment (experimental pathology). Even in the more comprehensive works on pathology it is customary to include only a relatively small part of the subject-matter of pathological physiology, the larger part being assigned to works on clinical medicine. Both pathological anatomy and pathological physiology have been greatly advanced by the aid of chemistry (pathological chemistry). The term 'general pathology' is used to include both general pathological anatomy and general pathological physiology, and embraces the consideration of such topics as the nature and causes of diseases, morbid processes common to many diseased conditions, and disturbances of function resulting from such processes. Pathology treats of all abnormalities in the process of development of the individual and of their results. It considers all the untoward results of outward influences, be they physical or chemical, or of those more complex influences which we may designate biological, as well as those subtle characters of the organism itself which, often hereditary, render it more or less prone to these influences, and give it the power of arranging a protection for itself and recovering its normal state. PATHOLOGIC, a. *păth-ō-lŏj'ĭk*, or PATH'OLOG'ICAL, a. *-ĭ-kăl*, pertaining to pathology. PATH'OLOG'ICALLY, ad. *-lĭ*. PATHOLOGIST, n. *pă-thŏl'o-jĭst*, one versed in, or who treats of, pathology.

PATHOS, n. *pā'thŏs* [Gr. *pathos*, suffering, an emotion of the mind]: the manner or style of speech which excites the tender and more painful emotions of the mind. Pathos is a recognized source of æsthetic value, especially in the drama in which many of the nobler human sentiments are aroused by pathos.

PATIENCE, n. *pā'shĕns* [F. *patience*—from L. *patientĭă*, patience, forbearance—from *patĭor*, I suffer or endure]: the power or quality of suffering or enduring; calm endurance of pain or labor; calmness of temper under provocation or any calamity; long-suffering; continuance of labor; endurance; resignation; fortitude. PATIENT, a. *pā'shĕnt* [F.—L.]: that can suffer or endure calmly; enduring trials without murmuring or discontent; not easily provoked; persevering; calmly diligent; not over-eager or impetuous: n. a sick person; one laboring under some bodily disease and under professional treatment. PA'TIENTLY, ad. *-lĭ*.

PATIN: see PATEN.

PATINA, n. *păt'ĭ-nă* [It. *patĭna*, the varnish of bronze or copper plates: F. *patine*, the fine rust of coins: L. *patĭnă*; Gr. *patanē*, a flat dish]: the fine varnish-like green rust found covering coins that have been long embedded in particular soils.

PATMOS, *păt'mŏs;* called now PATINO, *pâ-tē'nō* or PATMO, *pât'mō:* bare and rocky island of the group called the Sporades, in the Ægean Sea, s. of Samos; about 45 m. in circumference. It is notable as the place to which the apostle John was exiled, where he saw the visions recorded in the Book of Revelation. On the top of a mountain stands the famous monastery of 'John the Divine,' built in the 12th c. On the e. side of P. is a small village and port. The barren island is under Turkish rule, but is inhabited by Greeks, about 4,000 in number.

PATNA, *păt'na* (or PATANA, i.e., the town): chief city of a dist. in Bengal locally known as Azimabad; on the s. bank of the Ganges, 330 m. n. w. of Calcutta; within the walls, the city measures 1½ m. from e. to w.; but including suburbs and Bankipur on the w., its area is 18 sq. m. Pop. of city proper (1901) 134,785. The general aspect of P. is mean and unattractive, but its river frontage of about 7 m., its railway communication, and its central position at the junction of three great rivers, the Son, the Gandak, and the Ganges—avenues for traffic of the N. W. Provinces—make it an important commercial centre. The chief imports are cotton goods, oil-seeds, salt, sugar, wheat, and other cereals. The export trade, except in oil-seeds and salt, is small. The chief buildings are the Gola or govt. granary, used in the famine of 1874; the Patna College; the govt. opium factory; a Rom. Cath. church, and several mosques. The seat of civil govt. is at Bankipur.

P., under its early name *Pataliputra*, is supposed to have been founded B.C. 600 by Raja Udayaswa. It was visited by Megasthenes, Greek historian, about B.C. 300, and called Palibothra by him. In modern times, P. is notable as the scene of a massacre of British prisoners by Meer Cossim 1763, leading to war and annexation by the English; and for the mutiny at Dinapur, the military station attached to P., 1857. It was also the headquarters of a Mussulman conspiracy 1864.—The *district* of P., under jurisdiction of the lieut. gov. of Bengal, has 2,079 sq. m.; pop. over 1,756,856.—The *division* of P. has 23,647 sq. m.; pop. 15,063,944.

PATOIS, n. *păt'waw* [F. *patois*—from mid. L. *patrien'sis*, a native—from L. *patrĭă*, one's native country]: the peculiar dialect of the lower classes in any country, and in any district of a country; provincial and corrupted speech: see DIALECT.

PATON, *păt'on*, Sir Joseph Noel, R.S.A: distinguished Scottish artist: b. Dunfermline 1823. It is understood that in early life he employed himself in making designs for the damask manufacturers of his native place, and for the muslin and lace embroiderers of Paisley. He soon turned his attention to art proper; and his cartoon sketch, *The Spirit of Religion*, gained one of the three premiums at the Westminister Hall competition 1845. Two years thereafter, his oil-picture of *Christ Bearing the Cross*, and his *Reconciliation of Oberon and Titania*, jointly gained the prize of £300. He subsequently executed a companion-picture to the *Reconciliation*, entitled the *Quarrel of Oberon and Titania;* both now in the Royal Scottish Academy's galleries in Edinburgh. These pictures made the artist's reputation. Although somewhat hard and dry in color, and without any retiring and shadowy depth, they are full of brilliant fancy; and the multitudes of figures, and the variety of fairy incident, affect the spectator much as the constant sparkle of Congreve or Sheridan affects the reader. He has since painted much more simply and powerfully. *Dante Meditating the Episode of Francesca*, was exhibited in Edinburgh 1852; and the *Dead Lady*, a work of great and solemn pathos, 1854. In 1855, his great picture, *The Pursuit of Pleasure*, was exhibited in that city, where it was much criticised and much admired. He has since painted *Home from the Crimea*, a *replica* of which is in the possession of Queen Victoria; and *In Memoriam*, a scene from the Indian mutinies; and for the Assoc. for Promotion of Fine Arts in Scotland, a series of picture-illustrations of the *Dowie Dens o' Yarrow*. Among his important pictures are *Dawn: Luther at Erfurt, The Fairy Raid, Faith and Reason, Gethsemane, Christ and Mary at the Sepulchre, The Man of Sorrows, Mors Janua Vitæ, The Spirit of Twilight, Thy Will be Done* (1879), etc. Many of his works have been engraved, and are deservedly popular. Together with his brother he illustrated Aytoun's *Lays of the Scottish Cavaliers*, and 1864 he executed 20 illustrations of the *Ancient Mariner*. P. was appointed queen's limner for Scotland 1865, received knighthood 1867, and in 1876 was made LL.D. by Edinburgh Univ. He has published two vols. of poems.

PATONCE, *pâ-tŏns'*, Cross [Lat. *patens*, expanding]: in *heraldry*, a cross with its terminations expanding like early vegetation or an opening blossom.

Patonce.

PA'TOS, Lago des: see Rio Grand do Sul.

PATRAS, *pâ-trâs'* (anc. Patræ, Turk. Baliabadra): a fortified seaport, and the most important trading town in w. Greece, in the govt. of Achaia and Elis; on the e. shore of the gulf of P., 12 m. s.s.w. of Lepanto. It is overlooked by the strong citadel—on the site of the ancient Acropolis—crowning a ridge on whose s. slopes the ancient city, as well as the modern one before the revolution, was built

The P. of to-day stands on a level space close to the sea. The plain of P. is exceedingly valuable for the currants grown, which are the most important export of the town. Its harbor, though protected by a mole, is unsafe, and exposed to heavy seas. Earthquakes are frequent, and most of the houses are on that account of only one story. Capotes are made here of mixed wool and goat's hair; and, besides currants, oil, valonia, raw silk and cotton, wool, hides, wax, etc., are exported. P. is by far the most important commercial town on the continent of Greece, though it suffered severely during the Greek revolution. *Patræ* (still the Greek name) is the only one of the 'twelve cities' of Achaia which exists as a town; but most of its relics have been swept away by earthquake and revolution. Pop. about 26,000.

PA'TRIA POTES'TAS [L. power of the father]: term denoting the power which the civil law gave to the Roman father over his children, and which has been the foundation of the greatly modified paternal authority recognized in modern systems of jurisprudence. The right of a parent to control his child not come to years of discretion is a part of natural law, but the more extensive *patria potestas* of the Romans was probably a relic of those early times in which families, or tribes considered as families, led a wandering pastoral life in dread of each other, under the guidance of a chief, whom it was necessary to invest with almost unlimited authority.

By the Roman law, the *patria potestas* was acquired naturally, by the birth of a child in wedlock, or civilly, by legitimation or adoption. An unemancipated son or daughter, a grandchild by a son, or any other descendant by males, was viewed as part of the parent's property. In early times a father had the power of life and death over his children: by the Laws of the Twelve Tables he could sell them as slaves, or could transfer them to another family by adoption. Under the republic, the despotic authority exercised by fathers over their offspring was practically limited to a considerable extent by the censors; and several emperors issued constitutions to restrain the cruelties often perpetrated by fathers. First the right of sale, then that of life and death was taken away. Alexander Severus (reigned 222–235) restricted to moderate chastisement the right of the father, and Constantine declared the father who killed his son guilty of murder. By the early Roman law, the son, being in his father's power, could not acquire property for himself; his acquisitions all belonged to his father; hence he was incapable of making a testament. There were, however, particularly in later times, modes by which he could acquire *peculium*, or property which should be independent of his father. A father might give his son property to trade on, which would be his own; and later a son acquired for himself whatever he gained in military service, or by the discharge of certain civil functions. In all matters belonging to the *jus publicum* a son was independent of his father; he could vote at the elections, hold the most important offices of state, or command the army

In later times, a son promoted to the consular dignity ceased to be under the restraints of paternal control, but, unlike an emancipated son, he retained his rights of succession. Lawful children were entitled to aliment from their parents; an obligation attached in the first instance to the father and mother, and failing them, to the grandfather. Until the time of Justinian (reigned 527–565) illegitimate children had a claim for support against their mother only; that emperor gave them a right to demand aliment from their father.

In no modern system has the paternal power been carried so far as under the Roman law. By the law of England, a father is guardian to his lawful children in minority, though this right ceases to some extent at the age of 14. He has the power of moderate chastisement. As guardian, he receives the rents of any real estate which the child may possess, which he must account for when majority is attained. The paternal power never extends beyond majority, and, to some effect, marriage acts as an emancipation. A father may by deed appoint a guardian to such of his children as are unmarried at his death till they attain majority. According to the French 'Code Civile,' a child is under the authority of his parents till majority or emancipation; up to that time he cannot quit the paternal residence without leave of his father, except for enrolment in the army at 18 years of age. Majority is attained at the age of 21, but a minor is emancipated by marriage. At 15 a minor may be emancipated by his father, or, if his father be dead, by his mother, by a simple declaration before a magistrate. The father possesses somewhat extensive powers of chastisement.

See PARENT AND CHILD.

PATRIARCH, n. *pā'trĭ-ârk* [F. *patriarche*, a patriarch —from Gr. *patrĭarchēs*, the founder or head of a family—from *patēr*, a father; *archē*, rule]: epithet applied to an aged man; the head of a family in ancient times: in the *Eastern* or *Greek Church*, an ecclesiastical dignitary superior to an archbishop (see PATRIARCH, below). THE PATRIARCHS, Abraham, Isaac, Jacob, and his 12 sons, progenitors of the Israelite nation. PA'TRIARCHISM, n. *-ĭzm*, government by patriarchs. PA'TRIARCHSHIP, n. *-shĭp*, or PA'TRIARCHATE, n. *-āt*, office, dignity, or jurisdiction of a patriarch; the residence of a patriarch. PA'TRIARCH'AL, a. *-ăl*, or PA'TRIARCH'IC, a. *-ĭk*, relating to patriarchs, or subject to them. PATRICIATE, n. *pă-trĭsh'ĭ-āt* [L. *patrĭcĭus*, noble]: the office of patriarch; the patriarchate: also the rank of a Patrician (q.v.). PATRIARCHAL CROSS, in *her.*, cross which, like the patriarchal crosier, has its upright part crossed by two horizontal bars, the upper shorter than the lower. A cross patriarchal fimbriated *or* was a badge of the Knights Templars

Patriarchal Cross.

PATRIARCH.

PA'TRIARCH: head of a family, household, or tribe, in the antediluvian period of Scripture history. The designation is still more familiar as denoting in the history of Israel the three progenitors of the Jewish people, Abraham, Isaac and Jacob. In later history of the Jews, after the destruction of Jerusalem, the title designated the heads of the Sanhedrim, one of whom, the patriarch of the west, resided at Tiberias, in Galilee, and the other, the patriarch of the eastern Jews, at Babylon. The most familiar use of the word is in the history of the Christian church, as the title of the bishops of certain great Metropolitan (q.v.) Sees, who held not only rank beyond other metropolitans, but also a jurisdiction almost identical with that of the metropolitan in his own province over all the metropolitans themselves (with their provinces) included in their district—the district being called a PATRIARCHATE. The name P. seems originally to have been given commonly to bishops, or at least was certainly given in a less special sense than it eventually assumed: the date at which the title first assumed its now received use cannot be exactly determined. It is certain, however, that the name and the office both were recognized before the Council of Nice, at which time, as we learn from the 6th canon, the patriarchal sees, acknowledged by 'ancient custom,' were three; Rome, Antioch, and Alexandria. After the translation of the seat of empire to Byzantium, thenceforward called Constantinople, that see, originally subject to the metropolitan of Heraclea, obtained, first metropolitan, afterward patriarchal rank; and eventually established a precedency over the patriarchates of Antioch and Alexandria, being second only to Rome. The contests between the patriarchs of Rome and Constantinople were among chief causes of the GREEK SCHISM (q.v.). To these four patriarchates was added a fifth, in 451, that of Jerusalem, formed out of the ancient patriarchate of Antioch. The limits of these five patriarchates can be only loosely assigned. The authority of a P. was, in the main, that of a metropolitan, but extended over the metropolitans themselves: he had a right to consecrate the metropolitans, and to preside over the councils of his patriarchate. After the Greek Schism, particularly after the establishment of the Latin Kingdom of Jerusalem, Latin prelates were appointed with the title and rank of P. in the four great Eastern sees. It was hoped that the union of the churches, effected at the Council of Florence, would end the contest thus created; but that union proved transitory, and the double series of patriarchs has been continued to the present day. The Nestorian and Eutychian sections of the Eastern Churches, too, have each its own patriarch; and the head of that portion of the Nestorian section, which in the 16th c. was reconciled with the Roman see, though known by the title *Catholicos*, has the rank and authority of P. After the separation of the Russian Church from that of Constantinople, the name and authority of the metropolitan in the end was transformed into that of P.; but the office was suppressed by Peter the Great.

besides these, which are called the Greater Patriarchates, there have been others in the Western Church known as Minor Patriarchates. Of these the most ancient were those of Aquileia and Grado· the latter was transferred to Venice 1451; the former was suppressed by Benedict XIV. France also had a P. of Bourges; Spain, for her colonial missions, a P. of the Indies; and Portugal a P. of Lisbon.

In the non-united Greek Church, the ancient system of the three partriarchates of Constantinople, Antioch, and Jerusalem is nominally maintained, and the authority of the patriarchs is recognized by their own communion; but the jurisdiction limits of the P. of Constantinople, who is acknowledged as the head, have been much modified. The Russo-Greek Church withdrew from him partially in the 17th, and finally in the 18th c. The patriarchate of Greece proper has been practically separated since the independence of the kingdom of Greece; and some years since it formally declared its independence. The patriarchs of Jerusalem and Antioch have few followers of their rite.

PATRICIAN, n. *pă-trĭsh'ăn* [F. *patricien*—from L. *patrĭcĭŭs*, patrician, noble—from *patrēs*, the fathers]: in *anc. Rome*, one of the nobility: ADJ. noble; not plebeian.—*Patrician* was the designation of the members of Roman *gentes*, of whom the *populus Romanus* consisted, and of their descendants by blood and adoption. *Patres* and *patricii* were in the early days of Rome synonymous; they were so named from the *patrocinium* which they exercised over the whole state, and all classes of whom it was composed. Niebuhr's researches have established that, until the *plebs* became a distinct order, the patricians were the entire citizens or *populus* of Rome; a select number of them were senators; and the original inhabitants, reduced to a condition of servitude, were known by the name of *clientes* or *plebs*. The amalgamation of the three tribes of Ramnes, Tities, and Luceres, gave rise to a distinction between *patres majorum gentium* and *patres minorum gentium*—the latter term being applied to families recently elevated to an equality with the old patrician class. On the establishment of the plebeians as a distinct order, sharing certain rights with the patricians, the patriciate became an aristocracy of birth, in exclusive possession of a number of important privileges. A long struggle between the two orders ended in the attainment by the plebeians of a political equality, and the establishment of a new aristocracy of *nobiles* based on wealth and office. Under Constantine, the dignity of *patricius* became a personal title; not hereditary, but conferring very high honor and certain privileges. It was created at Constantinople, and not confined to Romans or subjects of the empire, but bestowed sometimes on foreign princes. These patricians, unlike the old Roman order, were distinguished in dress and equipage from ordinary citizens. The popes in after times conferred the same title on eminent persons and princes, including many German emperors. In several Germanic kingdoms the title P. was bestowed on distinguished subjects; and in parts of Italy the hereditary nobility are still styled patricians. See NOBILITY

PATRICIANI, n. *pa-trĭs-ĭ-ā′nī:* in *chh. hist.*, Manichæan sect, followers of one Patricius, of whom nothing is known with certainty. They probably arose in the 4th c. They taught that suicide was lawful, since man's body was the work of the Devil. Epiphanius does not mention them.

PATRICIATE: see under Patriarch.

PATRICK, *păt′rĭk,* Marsena R.: soldier and agriculturist: 1811, Mar. 15—1888, July 27; b. Hounsfield, Jefferson co., N. Y. He graduated at U. S. Milit. Acad. 1835; served in Mexican war; was made capt. 1847; brevetted major 1849; resigned 1850, to engage in farming, and 1859 was made pres. of the N. Y. State Agricultural College. At the outbreak of the civil war he served as inspector gen. of N. Y. militia; became brig.gen. of vols. 1862, Mar.; was with Gen. McDowell in the valley of n. Va., and with the Army of the Potomac at South Mountain and Antietam. In Oct., after the battle of Antietam, he became provost-marshal-gen. to the army of the Potomac; later to the combined armies before Richmond; and, on Lee's surrender, to the dept. of Va. He resigned 1865, June 12, to resume agricultural interests; was pres. of the N. Y. State Agricultural Soc. 1867; commissioner for the state 1868–9, and 1879–80; and 1880–88 was gov. of the central branch of the national home for disabled volunteer soldiers, in Ohio. He died at Dayton.

PATRICK, Saint (Lat. *Patricius*): distinguished missionary of the 5th c., commonly known as the Apostle of Ireland: conjecturally 396–469; b. Bonavem Taberniæ. There is uncertainty as to date and place of his birth. The year of his birth has been variously assigned to 377 and 387, of which the latter, if not even a later date (396) is more probable. The date of his death is much disputed; the Bollandists placing it 460, while Ussher holds it to have been 493. Dr. Todd inclines strongly to Ussher's opinion; in which case P.'s age would have reached 126, or at least 116: more probable is the date 469 given in Tirechan's *Annotations.* Of the place of his birth, it is known from his own confession only that his father—a man of some dignity of position—had a small farm near Bonavem Taberniæ, which place is traceable as having been near the Solway, and s. of the wall of Severus; and in one of the ancient lives he is said to have been born at Nemthur. Arguing on these data, with collateral indications, many writers assign his birth to a place in the estuary of the Clyde (called from him Kilpatrick) at or near the modern Dumbarton. His father, he himself tells, was a deacon named Calpurnius; his mother, according to the ancient biographers, was named Conches or Conchessa; according to some of these authorities, a sister of St. Martin of Tours. P.'s original name is said to have been Succat, Patricius being the Roman appellative by which he was known. In his 16th year he was seized, while at his father's farm, by a band of pirates, and with a number of others was carried to Ireland, and sold to a petty chief

in whose service he remained six years, prob. in the county Antrim; after which he escaped; and devoted himself with noble zeal to the conversion of the Irish. The story that he went to France, where he became a monk first at Tours, afterward in the celebrated monastery of Lerins, and that he went, 431, to Rome, whence he was sent by Pope Celestine to preach in Ireland—is entirely without evidence, though long the received account. Much obscurity has arisen from confusing two other men of the name *Patricius* with this saint: one of these, under the name Palladius, was sent by Pope Celestine as bishop to Ireland 431. St. P.'s mission, on which he entered prob. about 425, was eminently successful. He tells us that he was incited to it by a vision, and by a voice calling him to labor in Ireland. Enthusiasm and sagacity seem to have been combined in his character. He adopted the expedient of addressing himself first to the chiefs, and of improving, as far as possible, the spirit of clanship, and other existing usages of the Irish for furtherance of his preaching; and beyond doubt he had much success in Christianizing the ancient Irish belief and practice. By degrees he visited a large portion of the kingdom, and baptized great numbers of the chieftains and of the people. According to the accounts of his Irish biographers, he founded 365 churches, and baptized with his own hand 12,000 persons. He is said also to have ordained a vast number of priests, and to have blessed very many monks and nuns. After he had been about 20 years engaged in his missionary enterprise, he is said to have fixed his see at Armagh about 454; and having procured two of his disciples to be ordained bishops, he held probably more than one synod, the decrees of which have been a subject of much controversy. He died at a place called Saul, near Downpatrick, and his relics were preserved at Downpatrick till the Reformation. The place is still venerated by the people. The only certainly authentic literary remains of St. P. are his 'Confession' and a letter, both of very rude Latinity, but of much historical interest. The letter is addressed to Coroticus, supposed to have been a Welsh chieftain named Caradoc (from whom Cardigan is named), who had made a descent on the Irish coast, and slain or carried off with great cruelty a number of the Irish, many of whom were neophytes. These, with some other remains ascribed to him, as also decrees of synods, were published in Wilkins's *Concilia*, and separately by Ware, *Opuscula S. Patricii Adscripta* (1656) and by Villanueva (Dublin 1835). The latest biography. of St P. is that of the Rev. J. H. Todd, 1 vol. 8vo. (Dublin 1863).

PATRICK, St., Order of: national order of knighthood for Ireland, established by George III. 1783, Feb. 5; enlarged 1833. As originally constituted, it consisted of the Sovereign, the Grand-master (always the lord-lieut. of Ireland for the time being), and 15 Knights. By the statutes of 1833 the number of knights was increased to 22.

The *Collar* of the order (of gold) is composed of roses with harps, tied together with a knot of gold, the roses

being enamelled alternately white within red, and red within white; and in the centre is an imperial crown surmounting a harp of gold, from which the badge is suspended. The *Badge* or *Jewel* is of gold, and oval; surrounding it is a wreath of shamrock proper on a gold field: within this is a band of sky-blue enamel charged with the motto of the order, QUIS SEPARABIT MDCCLXXXIII. in gold letters; and within this band a saltire gules (the cross of St. Patrick), surmounted by a shamrock or trefoil slipped vert, having on each of its leaves an imperial crown *or*, The field of the cross is either argent, or pierced and left open.

Order of St. Patrick.

A sky-blue *Ribbon*, worn over the right shoulder, sustains the badge when the collar is not worn. The STAR, worn on the left side, differs from the badge only in being circular in place of oval, and in substituting for the exterior wreath of shamrocks eight rays of silver, four of which are larger than the other four. The MANTLE is of rich sky-blue tabinet, lined with white silk, and fastened by a cordon of blue silk and gold with tassels. On the right shoulder is the HOOD, of the same materials as the mantle. The order is indicated by the initials K. P.

PATRICK, Simon, D.D.: Eng. divine: 1626, Sep. 8–1707, May 31; b. Gainsborough, Lincolnshire. He entered Queen's Coll., Cambridge, 1644; took orders 1651; was chaplain to Sir Walter St. John, and later vicar of Battersea, Surrey; was made rector of St. Paul's, Covent Garden, Lond., 1662; became Dean of Peterborough 1678, Bp. of Chichester 1689, and served that year in settling the affairs of Ireland; and 1691–1707 was Bp. of Ely. He was an author of hymns, chiefly from the Latin of Prudentius, and of sermons, devotional treatises, a translation of the *De Veritate* of Grotius, a *Commentary on the Historical and Poetical Books of the Old Test.* (to Canticles, 10 vols., 1695–1710, reprinted 1853), a controversial tract of some note 1668, and Autobiography, pub. 1839 at Oxford, and *The Appearing of Jesus Christ*, printed first 1863 at Cambridge. A collected edition of his writings appeared at Oxford 1859 (9 vols.). In practical divinity his writings have been held in high estimation.

PATRIMONY, n. *păt'rĭ-mŏn-ĭ* [L. *patrimōnĭŭm*, a paternal estate—from *patĕr*, a father: It. *patrimonio:* F. *patrimoine*]: a right or estate inherited from a father; a church estate or revenue. Pat'rimo'nial, a. *-mō'nĭ-ăl*, inherited from ancestors. Pat'rimo'nially, ad. *-lĭ*.

PATRIOT, n. *pā'trĭ-ŏt* [F. *patriote*, a patriot—from L. *patrĭă*, one's native country: Gr. *patrĭōtēs*, one of the same country—from *pater*, a father: It. *patriotto*]: one who loves his country, and exhibits great zeal in its interests; one whose ruling passion is the love of his country: Adj. devoted to the welfare of one's country. Pa'triot'ic, a. *-ĭk*, full of patriotism; actuated by the love of one's country. Pa'triot'ically, ad. *-lĭ*. Pa'triotism, n. *-ĭzm*, love of one's country; the passion which incites to the service of one's country.

PATRIPASSIANS, *pā-trĭ-păs'ĭ-anz*, or *-păsh'anz* [from L. *pater*, father, and *passus*, suffered]: one of the earliest anti-Trinitarian sects; which in maintaining the oneness of the Godhead, held that all that is ascribed in the Scriptures, according to the Trinitarian exposition, to any of the Three Persons, is in reality true of the one Principle, whom alone these sectaries accepted as Deity; from which tenet they were termed 'Monarchians' [Gr. *monos*, one, and *archē*, principle]. The leader of this sect was Praxeas, native of Phrygia, who lived in the end of the 2d c. The name P. (Greek equivalent *Patropaschites*), was in some sense a sobriquet, being founded on what their antagonists regarded as the absurd consequence derivable from their doctrine—viz., that as it was true to say that Jesus, in whom dwelt the Logos, or the Son, suffered, therefore it would be true on their principle to say that the Father suffered. The sect in this particular form was known chiefly in Rome; but their principles are mainly the same with those of the Sabellians. In Rome, Praxeas was succeeded by Noetus, but the party does not appear to have been numerous or influential.—In recent times, the doctrine of the suffering in some sense of the Eternal Father,

for and with simple men, is held, in an undeveloped form by many Christians to whose sense of the Divine tenderness it appeals, but who refrain from the philosophical entanglements in which the doctrine anciently was involved. See MONARCHIANISM.

PATRISTIC, a. *pă-trĭs'tĭk*, or PATRISTICAL, a. *-tĭ-kăl* [F. *patristique*—from L. *patrēs*, the fathers]: pertaining to the writings or theology of the ancient fathers of the Christian Church.

PATRISTIC PHILOSOPHY: The philosophy of the church fathers. The period covered by patristic philosophy is generally regarded as extending from the time of the Apostles to the time of Charlemagne. Ueberweg, whose usage is not always adopted, divides the movement into two periods, the first extending up to the Council of Nice (A.D. 325); the second extending from this to the end of the epoch, say 755. Within these divisions must be recognized manifold diversities of doctrine. In the earlier period occurred the antagonism between Jewish and Pauline interpretations of the teachings of Jesus. Early in the movement appeared the Gnostics (q.v.). Theirs was the first serious attempt to construct a religious philosophy on Christian foundations. Taken as a whole the attempt failed through the intellectual incapacity of its exponents to handle the deep problems with which they found themselves confronted. The general outcome of the effort was a form of mysticism. Conspicuous among the representatives of Gnosticism may be mentioned Carpocrates, Basilides, Valentinus and Bardesanes. Notable in the generation following the early Gnostics is Justin Martyr, who was a convert from paganism of a Platonic type. His teachings are closely akin to those of the primitive Catholic Church. He defended Christianity against the Jews and other heretical critics. In Tatian (flourished in the 2d century A.D.) we meet an Assyrian defender of the faith who combines oriental ideals with a bitter animosity against Hellenic culture. Theophilus of Antioch, Athenagoras of Athens were all philosophical apologists of Christianity. Irenaeus (b. A.D. 160) was an opponent of the Gnostics, holding that the apostolic ideas and teachings had been corrupted by pagan influences and that morality had in consequence been allowed to degenerate. His power in these directions, together with his works as bishop of Lyon and Vienne, entitle him to be considered as one of the important founders of the Catholic Church. Hippolytus, the disciple of Irenaeus followed in his steps. Tertullian (160–220), of Carthage, was a vigorous opponent of philosophy which he held to be heretical in its influence. He advocated an extreme form of ascetism. On the other hand men like Clement and Origen attempted to combine what they regarded as the true elements of Gnosticism with orthodox views of Christian teaching.

Philosophy served the Greeks, says Clement, as did the Mosaic law the Jews, to prepare for the full revelation of Christianity. For persons who require valid proofs for religious belief philosophy must still serve its function. Those portions of the patristic philosophy which dealt most explicitly with the significance of Jesus and the doctrines connected directly with his personality were developed by men of Hellenistic antecedents for the most part; the Latin fathers evolved philosophical speculations about general religious doctrines, such as immortality, God and the more narrowly ethical questions of right and wrong. Here may be mentioned Arnobius, Felix and Lactantius who flourished during the first three centuries A.D.

After the Council of Nice the Christian church found itself so firmly established and its main doctrines so definitely outlined, as to permit a development of these doctrines within the confines of accepted belief. At the outset of this period appears Gregory of Nyssa (331–394) a follower of Origen. He devoted himself to the exposition and philosophical defense of the Christian doctrines of the trinity, the immortality of the soul and its connections with the body, and finally the nature of evil and its relation to good. In Augustine (q.v.) (354–430) is generally recognized the completion of development of patristic thought. After his time, both in the eastern and the western branches of the church, the subsequent periods were essentially barren of new ideas. Augustine teaches the paramount value of Christian insight and experience as compared with philosophy. Authority and faith are forever supreme over science and human knowledge. To forestall scepticism Augustine bases certainty on the conviction of personal existence, a characteristically Cartesian principle. In Augustine patristic philosophy received its only reasonably complete formulation. The definite division between philosophy and religion, which Gregory had pointed out, here becomes fundamental. He entertained a high regard for certain portions of Neo-Platonic philosophy and was perhaps familiar with certain of the Platonic writings. From these sources not a little of his philosophic thought was no doubt drawn. His is the most distinguished figure produced by patristic thought. The moral purity of his teachings is fitly set off by the breadth and scope of his more technically philosophical achievements.

When the eastern and western branches of the church parted company, the development of doctrine was for a time stopped. With the beginning of Scholasticism we meet the resumption of religious speculation.

PATROCLUS, *pa-trō'klŭs:* the friend and brother in arms of the Greek champion Achilles, was the son of Menœtius, one of the Argonauts. On accidentally killing Clysonymus, in his early life in a game of dice at Opus,

he saved himself by flight, and reached Thessaly where he was kindly received by Peleus, who educated him as the companion of his own son. He accompanied Achilles to Troy, but the anger of Achilles kept him from taking a part in the war. At length Achilles permitted Patroclus to go forth to battle, and loaned him his armor. Apollo stunned him and rendered him defenseless, and he was slain by Euphorbus and Hector. Achilles then avenged his friend by challenging Hector and slaying him in single combat.

PATROL, n. *pă-trōl'* [F. *patrouille;* Sp. *patrulla;* It. *pattuglia,* a night-watch: F. *patrouiller,* to paddle in the water—from *patte,* the paw]: small detachment of soldiers (perhaps five or six) from the main-guard or picket, under a corporal or sergeant, ordered to march a certain round either within a garrison or camp, or in the streets of a town, generally during night or in times of excitement, to arrest disorderly persons or soldiers out of barracks, and to preserve the peace: the act of thus going round. In a besieged fortress, a patrol is a strong body of troops sent out to traverse the lines of defense, in front of the sentries, to obtain intelligence of the enemy and to watch against assault. PATROL, v. to march through or round; to go the allotted rounds, as a guard. PATROL'LING, imp.: n. the performance of the duties of a patrol. PATROLLED, pp. *pă-trōld'.* In early American history the word patrol was applied to a military system adopted by the parishes of most of the Southern colonies, notably South Carolina, where it was established in 1704. The patrol was a sort of police for the parish, and was designed especially to prevent and subdue insurrections among the slaves. The patrollers furnished their own pistols and horses. They rode from plantation to plantation and arrested all slaves who could not show passes from their owners.

PATRON, n. *pā'trŏn* [F. *patron,* a patron—from L. *patrōnus,* a protector—from *pater,* a father: Gr. *patrōn*]: *literally,* one who takes the place of a father; one who countenances and protects either a person or a work (see PATRON, below): a person who has the gift and disposal of church preferment (see PATRONAGE, ECCLESIASTICAL): ADJ. giving aid or exercising guardianship, as a patron saint. PA'TRONLESS, a. *-lĕs,* without a patron. PATRONAGE, n. *păt'ron-āj,* protection; special countenance or support; power of bestowing some office, title, or privilege (see PATRONAGE, ECCLESIASTICAL): in OE. for *patronize.* PA'TRONESS, n. *-ĕs,* a lady who protects or countenances. PA'TRONIZE, v. *-īz,* to support; to countenance; to encourage; to favor or promote. PA'TRONIZING, imp.: ADJ. acting as a patron; favoring; promoting. PA'TRONIZED, pp. *-īzd.* PA'TRONI'ZER, n. *-zer,* one who patronizes. PATRON SAINT, in the *Rom. Cath. Ch.,* some saint assumed as a guardian either of a person or a place. CARDINAL PATRON, *the* prime minister of the pope.

PATRON: among the Romans originally a citizen who had dependents, who were called *clients*, attached to him. Before the time of the Laws of the Twelve Tables, the most frequent use of the term *patronus* was in opposition to *libertus*, these two words being used to signify persons who stood to one another in the relation of master and manumitted slave. The Roman was not denuded of all right in his slave when he freed him; a tie remained somewhat like that of parent and child, and the law recognized important obligations on the part of the *libertus* toward his P., whose neglect involved severe punishment. In some cases the P. could claim a right to the whole or part of the property of his freed man. The original idea of a P. apart from the manumitter of slaves continued to exist. A Roman citizen, desirous of a protector, might attach himself to a P., whose client he thenceforward became; and distinguished Romans were sometimes patrons of dependent states or cities, particularly where they had been the means of bringing them into subjection. Thus the Marcelli were patrons of the Sicilians, because Claudius Marcellus had conquered Syracuse and Sicily. The P. was the guardian of his client's interest, public and private; as his legal adviser, he vindicated his rights before the courts of law. The client was bound, on various occasions, to assist the P. with money, as by paying the costs of his suits, contributing to the marriage portions of his daughters, and defraying in part the expenses incurred in discharge of public functions. P. and client were under an obligation never to accuse one another; to violate this law amounted to the crime of treason, and any one was at liberty to slay the offender with impunity. One obvious effect of the institution of *clientela* was the introduction of an element of union between classes of citizens who were otherwise continually brought into opposition to each other. As the P. was in the habit of appearing in support of his clients in courts of justice, the word *patronus* acquired, in course of time, the signification of advocate or legal adviser and defender, the client being the party defended; hence the modern relation between counsel and client.—*Patron*, in after times, became a common designation of every protector or powerful promoter of the interests of another; and the saints, who were believed to watch over the interests of particular persons, places trades, etc., acquired in the middle ages the title patron saints. The saint in whose name a church is founded is considered its patron saint.

The term P. has been applied also to those who endowed or supported churches and convents. See PATRONAGE, ECCLESIASTICAL.

PATRONAGE, ECCLESIASTICAL: right (recognized especially in churches by law established, as in England) of presenting a fit person to a vacant ecclesiastical benefice. Nothing of the kind is known in the United States. The patron, in the original and more strict sense, was the person who founded or endowed the church. In the early ages of Christianity, the countries where the new religion

had been adopted were parcelled out into large districts or dioceses, under superintendence of a bishop, who usually resided in the neighborhood of one of the religious houses. Within such district the bishop had the nomination of the priests, who supplied religious instruction to the people. The priests were paid out of the episcopal treasury, and travelled about in the exercise of their duties, having their residence with the bishop, and forming that *episcopi clerus* which constituted the notion of cathedral churches and monasteries in their simplest form. Occasionally a bishop endowed a church in his diocese, and attached a priest permanently to it; and in Gaul, in the 5th c., a bishop who founded a church in a neighboring diocese was allowed to appoint an incumbent of his choice. As Christianity became more universal, and the population increased, the means of worship supplied by the bishoprics, the monasteries, and occasionally episcopally endowed churches, became inadequate for the demands of the people, and the proprietors of lands began to build and endow churches in their own possessions. In such cases the chaplain or priest was not paid by the bishop, but was allowed to receive for his maintenance, and for the use of his church, the whole or a part of the profits of the lands with which the founder had endowed it, and the offerings of those who frequented the church for worship. A district was defined by the founder, within which the functions of the officiating priest were to be exercised; and both the burden and the advantages of his ministry were limited to the inhabitants of that district. As these pious foundations tended both to the advancement of religion and to the relief of the episcopal treasury, they were encouraged by the bishops, who readily consecrated the churches thus established, and consented that the incumbent should be resident at the church, and receive the tithes and offerings of the inhabitants and what endowment the founder had annexed to the church. Eventually, it came also to be stipulated with the bishop that the founder and his heirs should have a share in administration of the property, and have the right to nominate a person in holy orders to be the officiating minister whenever a vacancy occurred. It became also a not unusual arrangement that when owners of estates rebuilt such churches as were dependent on the cathedral, or undertook to pay the incumbent, to the relief of the cathedral, the right of presentation was transferred from the bishop to these persons, who thenceforward stood in the same relation to these churches as if they had been the original founders. Out of these private endowments arose the parochial divisions of a later time, which thus owe their origin rather to accidental and private dotation than to any legislative scheme for the ecclesiastical subdivision of the country (see PARISH). The bounds of a parish were at first generally commensurate with those of a manor, and the lord of the manor was the hereditary patron. The person having the privileges of a founder was called *patronus* and *advocatus*. He had a preeminent seat and a burial place in the church; he held a

precedence among the clergy in processions; his name and arms were engraved on the church and on the church-bells, and he was specially named in the public prayers. He had the right to a certain portion of the church funds, called *patronagium*, and received the fruits of the benefice during a vacancy. In the course of time it happened sometimes that, with concurrence of all parties interested, the patronage, and the church with its revenues and appurtenances, were made over to a religious house, which thus became both patron and perpetual incumbent of the parish, while the immediate duties of the cure were devolved on a vicar or stipendiary curate. In France, the right of patronage was often extended to churches not originally private foundations by the necessities of the sovereigns, which led them to take possession of church property, and bestow it in fee on laymen, who appropriated the greater part of the revenues, and took the appointment of the clergy into their own hands. For a length of time, not merely the nomination but the investiture of the clergy came to be exercised by lay patrons, a state of matters which roused the indignation of successive popes and councils: until it was at last ruled by the third and fourth Lateran Councils (1179 and 1215) that the presentation of the patron should not of itself suffice to confer any ecclesiastical benefice, even when qualified by the discretionary power of rejection given to the bishop, when the presentee was a layman. It was declared necessary that the presentee should not merely have the temporalities of the benefice conferred on him by induction, but also be invested with the spiritualities by institution. When the bishop was patron of the benefice, the ceremonies of induction and institution were united in that of collation. With the growth of the papal power, however, a practice arose by which the right of presentation or induction, which had nominally been left to the patrons, became in some degree nugatory. Toward the close of the 12th c., letters of request, called mandates or expectatives, began to be issued by the popes to patrons, praying that benefices should be bestowed on particular persons. What had at first been requested as a favor was soon demanded as a right, and a code of rules was laid down with regard to grants and revocations of expectatives. In the 13th c. the patronage of all livings whose incumbents had died at the court of Rome (*vacantia in curiâ*) was claimed by the pope; and as ecclesiastics of all ranks from every part of Europe frequently visited Rome, the number of benefices *vacantia in curiâ* was always very great. Clement V. went so far as broadly to declare that the pope possessed the full and free disposal of all ecclesiastical benefices. The practice next arose of the pope making reversionary grants, called provisions of benefices, during the lifetime of the incumbent, and reserving what benefices he thought fit for his private patronage. By means of permissions to hold benefices *in commendam*, and dispensations for non-residence and holding of pluralities, more than 50 benefices were often held by one person, and throughout all Europe the principal benefices were

filled by Italian priests, nominees of the popes—priests often ignorant of the language of the people among whom they ministered. In the 14th c. these claims encountered much opposition. England took the lead in an organized resistance, which was in the end successful. A series of English statutes was passed, beginning with the Statute of Provisors, 25 Edw. III. c. 6, solemnly vindicating the rights of ecclesiastical patronage, and subjecting to severe penalties (see PRÆMUNIRE) all persons who should attempt to enforce the authority of papal provisions in England. The principles adopted by the third and fourth Lateran Councils (see above) have since been substantially the law of patronage in Rom. Cath. countries. A lay patron is, by the canon law, bound to exercise his right of presentation within four, and an ecclesiastical patron within six, months, failing which the right to present accrues *jure devoluto* to the bishop of the diocese. Patronage has always been more or less subject to alienation, transmission, and the changes incident to other kinds of property. For the modern practice of patronage in the Rom. Cath. Church, see PROVISION.

In England, where the modified canon law, which was in use before the Reformation, is still in force, the rights of patrons do not differ materially from those which they possess in Rom. Cath. countries. For some details regarding the right of presentation in England, see ADVOWSON.

In Scotland, at the Reformation, the rights of patrons were reserved, and presbyteries were bound by several statutes to admit any qualified person presented by the patron. The principle of these statutes was retained in the enactments introducing Episcopacy. On the establishment of Presbytery under favor of the civil war, patronage was abolished by act 1649, c. 23, and the election of the clergy was committed to the kirk-session. At the Restoration (1660) this statute fell under the act rescissory, and patronage was replaced on its former footing. On the reintroduction of Presbytery at the Revolution (1688) patronage was again cancelled, and the right to present conferred on the Protestant heritors and the elders of the parish, subject to the approval or rejection of the whole congregation. In consideration of being deprived of the right of presentation, patrons were to receive from the parish a compensation of 600 merks (£33 6*s*. sterling), on payment of which they were to execute a formal renunciation of their rights. Only three parishes effected this arrangement with the patron, and patronage was permanently restored in all the parishes where no renunciation had been granted by 10 Anne, c. 12. This act, with modifications introduced by 6 and 7 Vict. c. 61, was law till 1874. If a patron failed to present for six months after the occurrence of a vacancy, the right to present fell to the presbytery *jure devoluto*. The presentee, before he acquired a right to the emoluments of the benefice, was required to be admitted to it by the presbytery of the bounds. He was first appointed to preach certain trial sermons. Within six weeks the people were invited to sign a written call to

the presentee to be their minister, and however few the signatures to the call might be, the presbytery were accustomed to pronounce a formal judgment sustaining it. They then proceeded to examine into the qualifications of the presentee, and, provided the result were satisfactory, the ordination followed (if he had not been previously ordained), and he was formally admitted minister of the parish by the presiding minister. Soon after the above-mentioned act of Queen Anne, a feeling which had sprung up in favor of popular election, in opposition to patronage, led to various acts of resistance to the settlement of presentees, and brought about two considerable secessions from the Church of Scotland. It continued for a length of time to be a subject of dispute how far the right of the church to judge of the fitness of presentees could entitle her to make rules tending to disqualify them, and in particular whether she could legally make the dissatisfaction of the congregation a disqualification. For a long time prior to 1834, there had been no attempt to give effect to any dissent on the part of the congregation. In that year the law of patronage again became a ground of contention, when a majority of the general assembly of the church embodied their views on the subject in the so-called Veto Act, which declared that no minister was to be imposed on a congregation when a majority of heads of families and communicants should dissent. The decision of the court of session, confirmed by the house of lords, finding this act to be *ultra vires* of the general assembly, led to the secession of 1843 and formation of the *Free Church* (q.v.). After that event, an act, 6 and 7 Vict. c. 71, commonly called Lord Aberdeen's Act, was passed to fix by a legislative provision the effect which the church courts were in future to be entitled to give to the dissent of the congregation in the collation of ministers. It was there enacted that, after the trial sermons, the presbytery should give to the parishioners, being members of the congregation, an opportunity to state objections which did not infer matter of charge to be proceeded against according to the discipline of the church. The presbytery were either to dispose of the objections, or to refer them to the superior church judicatory; and if they were considered well founded, the presbytery might reject the presentee. No power was given to reject him on the ground of mere dislike by any portion of the congregation. By an act of parliament 1874, patronage in Scotland was abolished, and the right of choosing their minister transferred to the congregation, provision being made to compensate the previous patron to the extent of one year's stipend of the parish.

In the Prot. churches of Germany, Sweden, and Denmark, patronage exists to some extent, subject to restrictions, which differ much in different localities. The right to present is sometimes divided between the patron and the consistory. The parishioners have in many instances a voice: the appointment may be entirely in their hands, or they may have merely a right to reject the presentee after he has been subjected to the ordeal of a trial sermon; and

in either case this right may be exercised, according to local usage, either by the parishioners at large, by a committee of their number, or by the bürgermeister. When there is no patron, the choice generally rests with the consistory in East, and with the parishioners in West, Germany. Induction by the superintendent completes the right of the presentee.

In the Greek Church the right to present is generally in the hands of the bishops, excepting in Russia, where lay patronage exists to a limited extent.

PATRONOMATOLOGY, n. *păt'rō-nŏm'ă-tŏl'ō-jĭ* [Gr *patēr*, a father; *onoma*, a name; *logos*, discourse]: the science of surnames or a treatise on them.

PATRONYMIC, n. *păt'rō-nĭm'ĭk* or *pā'trō-nĭm'ĭk* [OF. *patronymique*, derived from ancestors' names—from L. *patronymicus*, belonging to the father's name—from Gr. *patēr*, a father; *onoma*, a name]: properly a name taken from one's father; but applied generally to such names as express descent from a parent or ancestor. In Sanskrit, Greek, and Latin, patronymics are very numerous. They may be derived from the name of a father, mother, grandfather, or remoter ancestor; e.g. Atrides, i.e., (Agamemnon), son of Atreus; Philyrides, i.e. (Chiron), son of Philyra; Æacides, i.e. (Achilles), grandson of Æacus. The names of the founders of nations also have been used to form a sort of P., as when the Romans are called Romulidæ. In Greek and Latin the commonest terminations of patronymics are *ides* and *is*. Patronymics have no fewer than 13 recognized terminations in Sanskrit. A number of the surnames in use in modern times are patronymics; e.g., Johnson, son of John; Thomson, son of Thomas. Originally these names fluctuated from generation to generation, as still is, or very recently was, the case in Shetland, where Magnus Johnson's son calls himself John Magnusson or Manson. In the course of time, it was generally found more convenient to take a surname from one well-known ancestor, which should descend unchanged to the children of the bearer of it. The termination *s* is sometimes used as equivalent to *son*, as in Jones, Rodgers. To patronymics belong Norman, Highland, Irish, and Welsh surnames with the prefixes *Fitz*, *Mac*, *O*, and *Ap*, respectively. In many cases the *Mac* of the Highlands of Scotland ceased to have a fluctuating character only a few generations ago. In 1465, an act of the parliament of Ireland was directed against the use of patronymics. Every Irishman dwelling betwixt or among Englishmen in the counties of Dublin, Myeth, Uriel, or Kildare,' was ordered 'to take to him an English surname of a town, as Sutton, Chester, Trym, Skryne, Corke, Kinsale; or color, as White, Blacke; or arte or science, as Smith or Carpenter; or office, as Cooke or Butler; and that he and his issue should use the same.' In Wales it was long the practice to use a string of ancestral names, each with the syllable *Ap* prefixed to it. See NAME.

PATROON, *pâ-trôn':* holder of land received by grant from the Dutch governors of the province of N. Y., and subsequently confirmed by the English authorities. These grants carried certain manorial privileges and involved the rights of entail. Large areas in Albany, Rensselaer, Delaware, Greene, and Columbia counties, and smaller portions of other counties, were settled under this system. Rensselaerswyck, the largest manor, contained about 436,000 acres, and there were many others of great extent. The tenants could buy and sell their holdings, but were obliged to pay an annual fee of about 2 per cent. of the value of the property, and return the P. about one-thirtieth of the money obtained from its sale. The fee was payable in produce or money. The tenants were dissatisfied, but there was no open opposition till the Dutch settlers on the e. of the Hudson river were superseded by people from New England, who attempted to bring the land under the jurisdiction of Mass., and to invalidate the claims of the patroons. About 1745 and again soon after the revolution, the feeling was intense. Various laws were passed 1779 and 1785, but very little relief was obtained. On the death of Stephen Van Rensselaer (q.v.) 1839, his successor endeavored to collect the rents which he had allowed to fall behind, which amounted to about $400,000, and which the tenants had expected would be cancelled. The tenants, known as anti-renters, organized to resist payment. Associations were formed in 17 counties, the efforts of the patroons to eject the tenants resulted in bloodshed and great excitement, and in Delaware co. there was a general insurrection. The assoc. became a powerful factor in politics and secured favorable legislation. The trouble lasted 7 years, at the end of which period a modification of the claims of the patroons with action by the legislature and the courts led to a settlement. The new state constitution, adopted 1846, contained articles abolishing feudal tenures, pronouncing all lands in the state allodial, and prohibiting the renting of land for agricultural purposes for a period exceeding 12 years. Over 50 persons who had been imprisoned for connection with the uprisings were pardoned 1847. The land troubles in Ireland since 1880 have many points of resemblance with those above described. PATROON'SHIP, office or authority of a patroon.—See VAN RENSSELAER, KILLIAN.

PATTEE: see PATEE.

PATTEN, n. *păt'tĕn* [F. *patin*, a clog, a high-heeled shoe—from *patte*, a paw: Fin. *patina*, a shoe of birchwood: It. *pattino*, a skate, patten]: a wooden sole or sandal, with an iron ring beneath, worn by women under their shoes to protect the feet from wet; the base of a column or pillar.

PATTER, v. *păt'tĕr* [a word imitative of sound expressed by *pat, pat:* F. *patatras*, a word imitative of the noise of things falling or rolling]: to strike and make a sound like *pats* or slight blows repeated often and quickly, as falling drops of rain. PAT'TERING, imp.: ADJ. making a quick succession of slight blows, as, *pattering* feet, *pattering* rain. PAT'TERED, pp. *-tĕrd.*

PATTER, n. *păt'tĕr* [corrupted from F. *patois*, country speech: but probably only imitative of the *patter* of rain]: the dialect or manner of speech of a class, as thieves' *patter*. PAT'TERER, n. *-ĕr-ĕr*, one who talks the language of his class. *Note.*—It has been suggested that *patter* originated in the repeating of prayers, i.e., paternosters.

PATTERN, n. *păt'tĕrn* [F. *patron*, master of a ship or workshop, a pattern being the inanimate master by which the workman is guided: Dut. *patroon*, a model]: an original proposed for imitation; that which is to be copied or imitated; a sample; anything cut out or formed into a shape to be copied; a specimen; an example: V. in *OE.* to make in imitation of; to copy.

PATTERSON, *păt'ĕr-son*, DANIEL TOD: naval commander: 1786, March 6—1839, Aug. 15; b. Long Island. In 1800, he was midshipman under Capt. Bainbridge on the frigate *Philadelphia*, when that vessel ran aground near Tripoli and was captured. He remained a prisoner at Tripoli until 1805. In 1813 he became commander, and the next year conducted the naval force at the battle of New Orleans. On the island of Barataria, he destroyed the works of the pirate Lafitte. 1826-28, he had command of the *Constitution*. After 1836, until his death at Washington, he had charge of the navy-yard at Washington.

PAT'TERSON, JOHN: 1744–1808, July 19; b. New Britain, Conn. He graduated from Yale 1762, taught school, studied law, began practice, and became a justice of the peace at New Britain, Conn. In 1774 he removed to Lenox, Mass., and the same year became a member of the provincial congress, to which he was returned the following year. With a company which he raised in Berkshire co. within 18 hours of the reception of news from the battle-field of Lexington, he participated in the battle of Bunker Hill. He was engaged in several important battles, served with great credit throughout the war, and was promoted brig.gen. 1777, and maj.gen. 1783. He assisted in the suppression of Shays' rebellion 1786. Removing to Lisle, N. Y., he became a judge, was a member of the N. Y. state assembly 1792, of the constitutional convention 1801, and of congress 1803–05. He died at Lisle.

PAT'TERSON, ROBERT: 1753–1827, Aug. 5; b. Penn. When 22 years of age he settled at the present site of Georgetown, Ky., where he aided in erecting a fort. In 1779 he put up the first house in what is now Lexington, Ky.; was in several expeditions against hostile Indians, and rose to the rank of colonel. He owned one-third of the land which formed the original area of Cincinnati, and was one of the first settlers of Dayton, O., near which he died.

PAT'TERSON, ROBERT: 1792, Jan. 12—1881, Aug. 7; b. Cappagh, Tyrone co., Ireland. When quite young he came to Philadelphia. He served in the war of 1812 as 1st lieut., and then became a manufacturer and entered politics. He was maj.gen. of vols. in the Mexican war, and was prominent in the battle of Cerro Gordo. At the opening of the civil war he was maj.gen. of troops enlisted for 3

months, was stationed near Harper's Ferry to prevent the union of the Confederate forces under Johnston and Beauregard, but failed to accomplish the purpose and thus opened the way for the defeat of Gen. McDowell's forces at Bull Run. P. justified his failure by asserting that he had been instructed to wait for orders from Washington. At the close of his period of enlistment he retired to Philadelphia, where he conducted an extensive manufacturing business until his death. He published *A Narrative of the Campaign in the Shenandoah* (1865).

PAT'TERSON, Robert, LL.D.: 1743, May 30—1824, July 22; b. county Down, Ireland. He came to the United States 1768, commenced teaching in Penn., and was principal of an acad. in Wilmington, Del., 1774. He served in the revolution as military instructor, assistant-surgeon, and in other capacities, and 1779–1814 was prof. of math. in the Univ. of Pennsylvania. For some years he was an officer in the Philadelphia city govt., and 1805, by appointment of Pres. Jefferson, became director of the mint, which office he retained till his last illness. He was pres. of the American Philosophical Soc. 1819 till his death; edited various educational works; and published *The Newtonian System* (1808), and an *Arithmetic* (1819). He died in Philadelphia.

PAT'TERSON (BONAPARTE), Elizabeth: first wife of Jerome Bonaparte, youngest bro. of Napoleon I.; 1785, Feb. 6—1879, Apr. 4; b. Baltimore, Md.; daughter of William Patterson, a north of Ireland man, who had become, as owner of a line of ships, the wealthiest citizen of Md., except Charles Carroll of Carrollton. She was but 18 years old and young Bonaparte 19, when a love match was made, in spite of her father's opposition and the protest of the French consul; and the marriage was celebrated, 1803, Dec. 24, with a ceremony performed by the Rom. Cath. bishop, bro. of Charles Carroll, and a contract drawn by Alexander Dallas, with every precaution as to formality, witnesses, etc. Jerome's brothers, Joseph and Lucien, advised the young husband to adopt the country of his beautiful wife, and made efforts to secure him a provision adequate to living in the United States. To Napoleon, who was implacable toward any such marriage for his brother, the affair was most offensive, and when Jerome sailed with his wife, 1805, Mar., and reached Lisbon, a French frigate prevented their landing, and after he left her to go to Paris, she was compelled to take refuge in England—where her son, Jerome Napoleon, was born, 1805, July 7; and she never again saw her husband. The pope refused to dissolve the marriage, but Napoleon's denial of its legality and influence with his brother secured Jerome's marriage, 1807, Aug. 12, to Catherine of Würtemberg. The rejected wife had returned to the United States. Under Napoleon III., the legitimacy of her son's birth was recognized, but her suit for a share in Jerome's estate denied. She was alienated from her son by his marrying precisely as his father had done: and, spending much of her time in Europe, she saw the downfall of Na-

pleon III., and urged her grandson's claims in France, he having served with distinction in the French army. A woman of great beauty, noble manner, and brilliant conversational powers, she suffered the sorrows of pride, became misanthropic, and though rich was penurious.

PATTESON, John Coleridge, d.d.: bishop and martyr of the Melanesian Islands: 1827, Apr. 1—1871, Sep. 20; b. London: son of Justice John Patteson, and grand-nephew of the poet Samuel T. Coleridge. He was student at Eton and Oxford, graduated 1848; became fellow of Merton College 1852; studied Arabic and Hebrew at Dresden; was curate at Alfington 1853-55; then sailed with Bp. Selwyn to New Zealand. After work there, he left with the bp. 1856, in the mission ship *Southern Cross* for the scene of his labors, the Loyalty, New Hebrides Banks, Santa Cruz, and Solomon groups of islands,—'his children,' as he called the natives, dwelling 'in 200 islands.' In 1861, he was ordained bp.; 1867, established at Norfolk Island a college for native teachers from all the islands. After 1870, he was more or less ill from his labors as head of the college, sole tutor and steward, and primary schoolmaster all at once—these charges united with those of bishop and theological prof., with interludes of voyages which involved intense anxiety and watchfulness, and subjected him to the exhaustion of the tropical climate. His work was greatly complicated and often frustrated by the outrageous slave trade that grew up in 1870–1, to supply the white planters of Queensland and the Fiji Islands, under the name 'contract labor.' Besides the 'snatch-snatch' vessels (some of which carried an effigy missionary as a decoy), there were 'kill-kill' vessels, as the natives named them, pushing a tortoise-shell trade by aiding some of the more savage islanders in making decorative collections of skulls. From the natural mistake and vengeance of the persecuted people, Bp. Patteson met his death at Nukapu, one of the Santa Cruz group. He was a man of much success in his work, rare beauty of character, breadth of mind, and self-denying zeal.

PATTI, *pât'tē or păt'ē*, Adelina Maria Clorinda: operatic singer of Italian extraction; b. Madrid, 1843, Apr. 9. After a course of professional study, she sang at an early age in New York. Her *début* in London was in 1861 as Amina in *La Sonnambula;* and she has ever since held rank as one of the first singers of the day. Her voice is an unusually high soprano, of rich bell-like quality, and remarkable evenness of tone; to those qualities she adds purity of style and high artistic finish. Equally at home in tragic tenderness and vivacity of comedy, she has sung with success also in oratorio. On the continent of Europe, as well as in the United States and Great Britain, she has won golden opinions, receiving (1870) the order of merit from the emperor of

Russia. Her greatest success is generally considered to be in the part of Marguerite in Gounod's *Faust*. The Italian operas in which she most frequently sang were *Sonnambula, Lucia di Lammermoor, Il Barbiere di Siviglia, Don Pasquale, La Traviata, Rigoletto, Don Giovanni, Il Trovatore, I Puritani* and *Ernani*. She occasionally sang Wagnerian songs in concert. In November and December 1903 she made an American concert tour, which was a great financial success, and which showed that her vocal powers were only slightly impaired. 1868, May, she married the Marquis de Caux, from whom she was divorced 1885; in 1886 she married Nicolini, the tenor (d. 1898); and in 1899 Baron Cederstrom of Wales.

PATTI, CARLOTTA: 1840–1889; b. Florence, Italy, sister of Adelina M. C. Patti. She also was a leading vocalist, though a slight lameness prevented her from appearing much in opera. Her voice was a soprano of unusual compass, and of clear silvery quality, and much power in the upper register. Her peculiarly high notes, and graceful *abandon* of manner, brought her into favor with the public, though in quality of tone she did not equal her sister. After gaining high repute in the United States, she appeared in London 1862. In 1879 she married the 'cellist Ernst de Munck.

PATTISON, *păt'ĭ-son*, DOROTHY WYNDLOW (SISTER DORA); notable member of the (Prot.) Sisterhood of Good Samaritans, England: 1832, Jan. 16—1878, Dec. 24; daughter of the Rev. Mark James Pattison, rector of Hauxwell, Yorkshire. Though of remarkable beauty, grace, and vivacity, and under no necessity to leave home, she chose to extend the home lessons of charity by exiling herself as village schoolmistress in Little Woolston, 1861, and there gave her leisure to nursing the sick, having, at her father's wish, relinquished her desire to accompany Miss Nightingale to the Crimea. Overworking herself, she went as an invalid to Redcar, where she became better acquainted with the Good Samaritans at Coatham, and joined them 1864. The sisterhood is one of the 'secular,' i. e., devoted to active life, not contemplative, and apparently take no life-long vows, nor any but obedience to their pastor and the 'sister in charge.' The scenes of her devoted work were the Cottage Hospital at North Ormesby, and—from 1865—at Walsall (pop. 35,000) in the coal and iron district, South Staffordshire, where much misery existed and frequent accidents occurred. At one time she had sole charge of a small-pox hospital. Her charitable work took in the whole town, including the most abandoned classes. For her many labors, lovely traits, triumphs of tact and skill, and unwearied self-denials, the reader is referred to *Sister Dora* by Margaret Lonsdale (New York 1880).

PATTISON, Mark, English scholar and clergyman: b. Hornby, Yorkshire, 1813, Oct. 10; d. Harrowgate, Yorkshire, 1884, July 30. He was educated at Oxford, and in 1839 became a fellow of Lincoln College, Oxford. In 1843 he took priest's orders in the English Church and was appointed a tutor in Lincoln College the same year. He was at this time a follower of Newman, but presently drifted away from Tractarianism and became in his later years an extremely liberal member of the Anglican communion. In 1861 he became rector of Lincoln College and engaged actively in the work of university reform, and under him his college developed its resources and came into prominence in the university. He was a most thorough scholar, but often caustic in speech and always impatient of anything like pretense. To the famous book *Essays and Reviews* he contributed *Tendencies of Religious Thought in England* 1688-1750, and he was the author of *Suggestions on Academical Organization* (1868); a *Life of Isaac Casaubon* (1875), his principal work; *Life of John Milton* (1879), which has often been reprinted; *Sermons* (1885); *Memoirs* (1885), a somewhat morbid piece of autobiography extending only to 1860. Consult Tollemache, *Recollections of Pattison* (1885).

PATTISON, Robert Emory: American politician: b. Quantico, Md., 1850, Dec. 8; d. Philadelphia, Pa., 1904, Aug. 1. He was graduated from the Philadelphia Central High school in 1870 and admitted to the bar in 1872. He engaged in law practice, but soon turned his attention to politics, and in 1877-82 was city comptroller of Philadelphia. Owing to a split in the Republicans, in 1882 he was elected governor of Pennsylvania, although his party was in the minority, and served four years when he resumed his law practice. He was president of the Chestnut Street National bank, of the United States Pacific Railway commission in 1887-90, and in 1891-5 again served as governor of his state.

PATTISON, Thomas Harwood: American Baptist clergyman: b. Cornwall, England, 1838, Dec. 14; d. Rochester, N. Y., 1904, Feb. 13. He was graduated from Regent's Park College, England, in 1862, came to the United States, and last occupied the chair of homiletics and pastoral theology at the Rochester Theological Seminary. He published: *Present Day Lectures* (1872); *The History of the English Bible* (1894); *The Ministry of the Sunday School* (1902); etc.

PATTON, *păt'on*, Francis Landey, d.d., ll.d.: educator: b. Warwick, Bermuda, 1843, Jan. 22. He studied some time at University and Knox colleges, Toronto; graduated at Princeton Theological Seminary 1865; became pastor of Presbyterian churches at New York 1865, Nyack 1867, and Brooklyn 1871; and was chosen professor of theology in the Presbyterian Theological Seminary, Chicago, 1871. He held this professorship

till 1881, and in the meantime edited the *Interior* 1873-76, was pastor of the Jefferson Park Presbyterian Church 1874-81, was one of the chief prosecutors of Prof. David Swing, who was charged with heresy before the Chicago presbytery, and was moderator of the General Assembly 1878. In 1881 he was elected Stuart professor of the relation of philosophy and science to the Christian religion at Princeton Theological Seminary (a chair created expressly for him), and also professor of ethics in the College of New Jersey (now called Princeton University) and 1888 succeeded James McCosh, D.D., LL.D., as president of the latter institution. In 1891-2 he was conspicuous in his opposition to the action of Union Theological Seminary, New York, in supporting Charles A. Briggs, D.D. (q.v.), its professor of biblical theology, who had been charged with heresy because of utterances in his address at his induction to the office. He resigned the presidency of the university and became president of Princeton Theological Seminary, both in 1902. Besides contributions to periodical literature and addresses, Patton has published *Inspiration of the Scriptures* (Philadelphia, 1869), and *Summary of Christian Doctrine* (1874). Dr. Patton has become widely known as a very forcible speaker, and as a preacher combines erudition, logic and dry humor. His many papers and contributions on philosophical and theological subjects have shown him to be a keen, logical thinker.

PATTON, Frank Jarvis: American soldier and inventor: b. Bath, Maine, 1852; d. New York 1900, Nov. 12. After graduation from West Point in 1877, he was assigned to the 21st infantry, rose to the rank of 1st lieutenant in 1884, and resigned from the service in 1889. He experimented much with electricity, and was the inventor of the multiplex telegraph system. Among other devices of his was that of the gyroscope, used to determine the position of vessels in mid-ocean. At the time of his death he was interested in a business concern formed for the promotion of his invention for the manufacture of carbide.

PATTON, Jacob Harris, A.M., PH.D.: American historian: b. Fayette County, Pa., 1812, May 20; d. 1903. He was graduated from Jefferson College, Pa., in 1839 and from Union Theological Seminary in 1846. He was tutor in Union Seminary in 1843–6; in Nashville University 1840–3, and in the New York Classical School in 1846–87, after which he devoted himself to literature. Among his publications are: *A Concise History of the American People* (1869–82); *Yorktown*, 1781–1881 (1882); *Natural Resources of the United States* (1888); *Political Parties in the United States* (1902); *Political Economy for American Youth; Which Religion Satisfies the Wants of the Soul?; A Popular History of the Presbyterian Church in the United States;* etc.

PATTY, n. *păt'tĭ* [F. *pâté ;* OF. *pasté*, a pie] : a little but savory pie ; a pasty. PATTY-PAN, a pan to bake a little pie in.

PATULOUS, a. *păt'ŭ-lŭs* [L. *patŭlus*, standing open—from *patērĕ*, to lie open] : slightly spreading open.

PATUXENT, *pa-tŭks'ĕnt*, RIVER : stream in Md., rising 20 m. e. of Frederick City ; and after a s.e. course of 90 m. emptying by a broad estuary into Chesapeake Bay.

PAU, *pō :* flourishing town of France, cap. of the dept. of Basses-Pyrénées, on the right bank of the Gave-de-Pau, 105 m. s.s.e. of Bordeaux. It occupies a rocky height, cloven by a ravine through which a streamlet flows into the Gave-de-Pau: the two portions are united by a high bridge. Toward the s. Pau commands most magnificent views of the w. Pyrénées; indeed, for mountain views its situation is hardly surpassed by that of any town in France. As seen from this town, the distant Pyrénées rise in peaks, cones, and serrated ridges, and present an outline varied and strikingly beautiful. The town contains a palace of justice, a promenade, Royal Square, with a bronze statue of Henri IV., beautiful theatre, university-acad., museum, and library of 25,000 vols. Linen and cloth manufactures are chief industries; in the vicinity, Jurançon wine (good but strong) is grown. Many swine are fed in the vicinity, and from the pork the famous *Jambons de Bayonne* are made. Pau is a favorite resort of the English, especially during winter, and is a general rendezvous for those who wish to explore the Pyrénées. Pop. (1901) 34,268.

The principal building of Pau, and that to which it owes its existence. the old castle on the ridge overlooking the river, forms both the most conspicuous and most interesting feature of the town. It has five towers, united by an outer wall, and is supposed to have been founded by Gaston de Foix about 1363. Pau was cap. of the kingdom of Bearn, and its castle was the birthplace of the famous Henri IV.

PAU, or PAH, n. *paw* [a native name]: in *New Zealand*, a strongly fortified inclosure or stockade.

PAUCHON'TI TREE (*Isonandra polyandra*): large forest-tree, of same genus with the gutta-percha tree, and producing a substance similar to gutta-percha; abundant in some of the forests at the base of the w. Ghauts in India. It is now supposed that there are several species of *Isonandra* in w. India, the produce of all which is sent to the market as gutta-percha, though it is said that none of the kinds is equal in quality to the true gutta-percha, obtained from *Isonandra gutta*. The wood of the P. tree is very heavy, and its tenacity is equal to that of teak. A P. tree having been tapped in 40 places, from the base to 60 ft. high, has yielded in 12 hours about eight pints of sap, each pint being equal to about a pound of gutta-percha.

PAUCITY, n. *paw'sĭ-tĭ* [F. *paucité*—from L. *paucĭtatem*, a small number—from *paucus*, few, little]: smallness in number or quantity; fewness; scarcity.

PAUL.

PAUL, Apostle of Jesus Christ: the great apostle of the Gentiles: born at Tarsus, in Cilicia, of Jewish parents, from whom he seems to have inherited the rights of Roman citizenship. Concerning the dates of his birth and death, conjectures have been many and various, but nothing is definitely known. His original name was Saul: the name Paul was, according to one supposition, adopted at his conversion; according to another, his name was in two forms from the first—one Aramaic or Hebrew, the other Latin or Greek (compare Simon Peter, John Mark). We find only the name Paul as used by him or applied to him after he had entered on his apostleship beyond Palestine. Whether he was ever married is not known: I Cor. vii. 8, ix. 5, implied to Tertullian that he had never married, but to Clement of Alexandria and to Origen that he had become a widower. He was educated first in his native city, then in the zenith of its reputation for its schools of literature and philosophy, where he doubtless learned to speak and write Greek; and afterward, to be perfected 'in the law of his fathers,' was sent to Jerusalem, where he studied under Gamaliel (q.v.), a great Jewish doctor of the law; and became one of the strictest, most zealous, and most ardent Pharisees. Whether it was here or at Tarsus that he acquired his knowledge of the philosophy and literature of Greece, is not known. According to the wholesome rule among the Jews, that every person should learn some trade, Saul became a tent-maker, and at this trade he afterward labored at times when requisite during his apostleship (Acts xviii. 3) for his support. A few years after the death of the Lord Jesus, he became, as might have been expected from his training and temperament, a furious adversary of the new sect of Christians. We are told (Acts vi. 9) that the Jews of the Cilician synagogue at Jerusalem were among those who disputed with Stephen; and it is natural to suppose that the young and brilliant zealot, eager for disputation, was conspicuous among the crowd of Jewish students who poured out of their synagogues (of which, according to the Talmud, there were 480 in the holy city), in the insolence of their youth and scholarship, to crush the ignorant followers of the Nazarene. This supposition is rendered highly probable by the fact that he was present at the martyrdom of Stephen, which followed almost immediately, having charge of the raiment of them that slew him. The youthful Saul then became a prominent actor in the great persecution of the Christians that broke out at Jerusalem. The mysterious events that led to and attended his conversion, familiar to all readers of the Acts of the Apostles, need not be recapitulated here. After a solitary sojourn in Arabia—perhaps to calm his perturbed spirit in communion with God, and solemnly to prepare himself for his new mode of life—on his return to Damascus, he entered fully on his apostolic labors. Naturally, he became an object of intense hostility to the Jews in that city. They resolved to kill him; but his friends contrived a way of escape, and he fled to Jerusalem, where at first he was received with

distrust by the disciples; but afterward, through the kind offices of Barnabas, with great cordiality. He now 'spoke boldly in the name of Christ,' disputing also against the 'Grecians'—i.e., the Hellenistic Jews—with dangerous success, for his opponents sought to take his life. Again he was obliged to flee, and betook himself to his birthplace Tarsus, where he seems to have remained till Barnabas brought him to Antioch (not far off), to assist in the great work of evangelization going on in that city. After a short visit to Jerusalem in the year of the famine, A.D. 44, Paul and Barnabas were set apart by the prophets and elders of the church at Antioch for the evangelization of the more distant Jews. From Seleucia they proceeded on their first missionary expedition to the southern districts of Asia Minor, Pamphylia, Pisidia, and Lycaonia, where their preaching of the gospel occasioned great stir, and in some places met considerable success. It is very interesting to notice how gradually the light of Christianity dawned on the mind of the apostle. He did not grasp all at once its grand design. It was not even by abstract reflection that he arrived at it. Circumstances of quite an outward sort forced him to the broad and sublime conclusions of his creed. It was when the Jews of Pisidian Antioch, enraged at his preaching the gospel indiscriminately to their heathen fellow-townsmen as well as to themselves, the ancient covenant people of God, 'contradicted and blasphemed' him, that he boldly announced Christ as the universal Redeemer. After the return of P. and Barnabas to Antioch, they continued to labor in that city for a long time, till, dissensions having arisen about the circumcision of Gentile converts, he, with Barnabas and others, was chosen to go up to Jerusalem, to get the opinion of the apostles and elders there on the question, about A.D. 51. P. and Barnabas then returned to Antioch, where they continued to teach and preach, till a yearning grew up in Paul's heart to revisit his Gentile converts in Asia Minor. In his second expedition, P. was accompanied by Silas instead of Barnabas, and traversed the whole of Asia Minor from s. to n., evangelizing with great success; after which the two missionaries crossed the Ægean and landed in Europe, planting at Philippi, capital of Thracian Macedonia, the first Christian church on that continent. The details of his visits to Thessalonica, Berea, Athens, and Corinth are familiar; and we notice only his appearance at Athens, where, on Mars' Hill, before a crowd of the citizens, among whom were Epicurean and Stoic philosophers, he delivered that magnificent discourse in which he declared to the pagan Athenians the 'unknown' God, presenting Him as the almighty and all-wise Creator, Ruler, and Father of all men in every nation of the earth. On his return to Asia Minor he visited Ephesus, where, as usual, he 'reasoned' with the Jews in their synagogue; sailed thence to Cæsarea, in Palestine, and proceeded to Jerusalem 'to keep the feast;' after which he again returned to Antioch, the centre from which his operations radiated. Thus closed his *second* evangelistic journey.—The third

journey of P. commenced probably about A.D. 54, and extended over much the same district as the previous one. At Ephesus, where he remained two years and three months, his efforts were powerfully seconded by the eloquence of the great Alexandrian convert, Apollos. Here it is recorded (Acts xix.) that 'God wrought special miracles by the hand of Paul, so that from his body were brought unto the sick handkerchiefs or aprons, and the diseases departed from them, and the evil spirits went out of them.' 'In explanation of this procedure, unique among the miracles recorded in the New Test., it has been suggested that, as Ephesus was a city noted for its exorcisms, spells, and incantations—the famous *Ephesia Grammata* sold at a high price to the ignorant and superstitious populace—this style of miracle was a natural adaptation to the Ephesian mind with its belief in magic and dæmonism, and was intended to show them, according to their own way of regarding things, the superiority of Christ's power to that of the evil spirits of heathen worship. From Ephesus, P. went up to Jerusalem with a presentiment that heavy evils were about to fall upon him through the ever-maddening malice of the Jews. The Jewish populace were goaded into the wildest fury by the very sight of Paul. The captain of the Roman guard, Claudius Lysias, had to interfere to save him from being torn to pieces; but as forty Pharisees had sworn neither to eat nor drink till they had taken his life, he was sent by night, under strong escort, to the Roman governor, Felix, at Cæsarea, where he was unjustly, being uncondemned, detained a prisoner two years. Having finally appealed to the Roman emperor, according to the privilege of a Roman citizen, he was sent to Rome. On the voyage thither, he suffered shipwreck at Melita (probably Malta), in the spring of A.D. 61. At Rome he was treated with respect, being allowed to dwell 'for two whole years in his own hired house.' His first thoughts were, as usual, directed toward his Jewish brethren in the city; but, on the whole, he made little impression on them. Whether he ever left the city or not cannot be positively demonstrated, but it is believed by many critics, from a variety of considerations, that he did obtain his liberty about A.D. 64, and that he made journeys both to the east and to the west, revisiting Asia Minor and carrying out his long-cherished wish of preaching the gospel in Spain. Meanwhile occurred the mysterious burning of Rome, generally attributed to Nero (q.v.), who found it convenient to throw the blame on the Christians, and in consequence subjected them to a severe persecution. Among the victims, according to the views of many biographers of the apostle, was P., who, according to tradition, suffered A.D. 67 (or 64). Such positive assertions, in the lack of evidence, are without warrant; the most that can be said for them is that they are not improbable. The character and endowments of the apostle Paul have been well spoken of as 'many-sided.' He combined a dignity of nature, above all mere manner, with courtliness of address, and this with simple kindliness. He united the highest moral standard applied to himself and others,

with tender consideration for the ignorance or infirmity of the weak. He could suffer and die for truth, for principle; yet he could accommodate himself to classes and races, to Jew, or Greek, or Roman. He could crucify himself, yet keep clear of any real ascetism, recognizing every gift of God as good. At one time he would accept benefits; at another, for special reasons, support himself by the work of his hands. He was impetuous, yet held himself in due control. Sincerity, earnestness, glowing enthusiasm, unselfish purity of motive, singleness of purpose, shine through all his life, even when he was at first a persecutor. He knew that his mission, his work, his revelations received, were not less than those of the chief apostles; yet he spoke of his claims only under compulsion and with humility, even with frank acknowledgment of infirmities and former grievous error. His patience, perseverance, courage, endurance, even joyous hopefulness under extremities and physical sufferings, were seemingly unlimited. He honored all, high and low; he honored worthy women, found work for them in the churches, held them in remembrance, though he found it necessary to repress the disorderly or intrusive, in an age when, largely because of masculine error and oppression, women were ignorant and often trivial and shameless. He honored the relationships of life, though (probably married early, according to the rule of orthodox Jews) he remained a widower; and, in view of persecutions, once said of celibacy: 'I suppose this is good for the present distress;' but he denounced those who forbid to marry. He returned Onesimus to his master, but as a servant of Christ only. With all his broad character, he had a correspondingly broad intellect. He, and he alone, in an early period of his missionary career, took in the whole real scope of Christianity as a world-wide spiritual religion, the fruition of the Old Dispensation. It seems to have been largely a process of divine illumination, and perhaps native intuition; how far a logical process it is difficult to judge, since his expositions are much shaped by his early rabbinical reliance on scripture quotation, more or less pertinent, as taking the place of premises. His mind was incisive, going at once to root principles and root truths. Of these he had a clear and abiding grasp. He was not speculative, and stated opposite truths with no attempt to carry them up to reconcilement in pure reasoning. He was not æsthetic; indeed, though his first thirteen years were passed amid the grand scenery of Tarsus, and his after travels were wide, he draws scarcely any imagery from nature; yet his spiritual vision and fervor often lifted him to unsurpassed poetic eloquence. Profoundly contemplative, he was none the less a man of restless enterprise and great executive ability, as witness his ceaseless journeyings, and his planting and care of churches. He was an organizer of men as well as of truth. He was a reconciler of conscientious differences of faith and practice. In all this work, with all his burning zeal, he showed unfailing common-sense and sobriety of counsel. His was a con

stant steadiness of conviction and elevation of spirit. He had an enlightened forerunner in the martyr Stephen; yet his work was unique. If anything in the junctures of the world, and especially at the opening of the Christian era, were wanting, it was most strikingly supplied by the raising up of the apostle Paul, to develop the universal religion of Christ and especially to conceive, formulate, and proclaim the great central doctrines of justification by faith and freedom in grace. His work was the necessary, divine complement of that of his Lord and Master; and his doctrine has been repeatedly the great return tide after an ebb of faith.—See *Life and Epistles of St. Paul*, by Conybeare and Howson; Baur's *Paulus;* Lipsius, *Der Apostel Paulus* (1869); Renan, *Saint Paul* (1869); Pfleiderer, *Der Paulinismus* (1873; transl. 1878); Farrar, *St. Paul* (2 vols. 1879).

PAUL, Charles Kegan: English publisher and author: b. White Yackington, Somerset, 1828, March 8; d. London 1902, July 19. He was educated at Oxford, took orders in the Church of England, was made curate of Great Tew (1851) and Bloxham (1852), and after ten years of teaching at Eton became vicar of Sturminster, Dorsetshire. His views gradually developed a positivist character, and he therefore withdrew from his living and became reader for the publishing-house of H. S. King, to whose business he later succeeded. His firm published many important works and the *Nineteenth Century Review.* In consequence of financial troubles the concern was transformed into a limited company, of which Paul was manager until his retirement in 1899. Toward the close of his life he entered the Roman Catholic communion. Among his works are: *William Godwin* (1876); *Biographical Sketches* (1883); *Faith and Unfaith* (1891); *Memories* (1899).

PAUL, Lewis: English inventor: d. Brook Green, Kensington, 1759, April. In 1738 he obtained a patent for a cotton and wool spinning machine, this patent comprising an invention now in use in most of the world's cotton-mills. This invention consists of two pairs of rollers, one of which revolves at a velocity greater than that of the other. Cotton and wool are stretched (drawn) by being passed between these rollers. His invention never brought Paul substantial returns, and was commercially successful only when later employed by Arkwright. Among his other inventions are those of a carding-machine and another spinning-machine. Paul was a correspondent of Dr. Johnson.

PAUL II. (Pietro Barbo): b. Venice 1418, Feb. 26; d. Rome 1471, July 28. He was a nephew of Pope Eugenius IV., became a cardinal in 1440, and succeeded Pius II. in 1464. His first endeavor was to form an alliance of the Christian princes against the Turks, who at the time threatened to invade Italy, but in this he failed. He sought to stem the pagan tendencies of the Renaissance spirit.

PAUL III. (Alessandro Farnese), Pope of Rome, 1468, Feb. 28—1549, Nov. 10 (pope 1534–49); b. Carino, in Tuscany. Having been created cardinal, he served in several important trusts, and became Bp. of Ostia and Dean of the Sacred College. On the death of Clement VII., 1534, he was elected pope, at the crisis when the world was alive with expectation of the general council which was to decide all the controversies at that time agitating the public mind of Europe. After some delays, P. convoked the council to meet at Mantua 1542; but it did not actually assemble (in Trent) until 1545. These delays, by some charged on P., were doubtless due in great part to the difficulties of the times. The bull of excommunication and deposition which he issued 1538 against Henry VIII. of England is one of the last examples of the exercise of the temporal power claimed by the mediæval popes. In the contest of Charles V. with the Prot. League in Germany, P. sent a large force to support him, and he opposed the pacification proposed by the emperor on the basis of the Interim (q.v.). P.'s conduct in aggrandizing the fortune of his son, Pietro Luigi Farnese, has been severely criticised by historians; the more so, that this son was born out of wedlock, in the early youth of his father.

PAUL IV. (Giovanni Pietro Caraffa), Pope of Rome: 1476, June 28—1559, Aug. 18 (pope 1555–59); b. Naples, of the noble family Caraffa. His early career was distinguished for ascetic rigor. He was appointed Bp. of Chieti, in which see he labored most earnestly for reformation of abuses and for revival of religion and morality. With this view, he established, in conjunction with several congenial reformers, the congregation of secular clergy called Theatines (q.v.), and was himself the first superior. It was under his influence that Paul III. organized the tribunal of the Inquisition in Rome. On the death of Marcellus II., although in his 79th year, P. was elected to succeed. He entered on the wider career of reformation which his new position opened for him with all the ardor of a young man, and with all the stern enthusiasm which had characterized him during life. He enforced vigorously upon the clergy the observance of all the clerical duties, and enacted laws for maintenance of public morality. He established a censorship, and completed the organization of the Roman Inquisition: he took measures for alleviation of the burdens of the poorer classes, and for better administration of justice, not sparing even his own nephews, whom he banished from Rome for their corrupt and profligate life. His foreign relations involved him in labor and perplexity. He was embroiled with Emperor Ferdinand, with Philip II. of Spain, with Cosmo, Grand Duke of Tuscany. Having condemned the principles of the Peace of Augsburg, he protested against its provisions. Under the weight of so many cares, his great age gave way.

PAUL V. (Camillo Borghese), Pope of Rome: 1552 Sep. 17—1621, Jan. 28 (pope 1605–21); b. Rome. In early life, he was a distinguished canonist and theologian; and after the ordinary prelatical career at Rome, he rose first to the post of nuncio at the Spanish court, afterward to the cardinalate under Clement VIII. On the death of Leo XI., Cardinal Borghese was elected to succeed him. His pontificate is memorable for the famous conflict with the republic of Venice, into which he was plunged at the outset of his pontifical career. The original dispute was as to the immunity from the jurisdiction of civil tribunals conceded to the clergy, who claimed to be tried by ecclesiastical tribunals alone. This claim the senate resisted; and further causes of dispute were added by a mortmain law, and a law prohibiting the establishment of new religious orders or associations unless with the sanction of the senate. Each party remaining inflexible in its determination, P. issued a brief, directing a sentence of excommunication against the doge and senate, and placing the republic under an interdict, unless submission should be made within 24 days. The senate persisted, and an animated conflict, as well of acts as of writings, ensued, in the latter of which the celebrated Fra Paolo Sarpi on the side of the republic, and on the papal side Bellarmino and Baronius, were leaders. Preparations were even made for actual hostilities; but, by the intervention of Henry IV. of France, the dispute was accommodated, and peace restored 1607, though dissatisfaction afterward arose relative to the nomination of a patriarch. A misunderstanding of similar nature arose between the pope and the crown in France as to the rights of censorship on books, and as to the receiving of the disciplinary decrees of the Council of Trent; but it was removed by mutual explanations. P.'s civil administration was vigorous and enlightened, and he did much for promotion of useful public works, embellishment of the city, restoration and preservation of antiquities, improvement of the museums and libraries, and, above all, for the pious and charitable institutions of Rome.

PAUL (Petrowitch), Emperor of Russia: 1754, Oct. 2—1801, Mar. 24 (reigned 1796–1801); second son of the unfortunate Peter III. and Empress Catharine II. He became heir-apparent on the death of his elder brother 1763, and succeeded his mother on the imperial throne 1796. The tragical death of his father when P. was still a child, and the neglect and lack of confidence with which his mother treated him, exerted a baneful influence on the character of P., who was kept in compulsory seclusion while Catharine shared the administration of the government with her favorites. In 1776, P., on the death of his first wife, a princess of Hesse-Darmstadt, married Princess Dorothea of Würtemberg, by whom he had four sons—Emperors Alexander and Nicholas, and Grand Dukes Constantine and Michael—and several daughters. After spending some years in travelling with his wife through Germany, France, and Italy, P. was recalled by his mother.

who assigned to him the palace of Gatchina, 30 m. from St. Petersburg, as his settled residence, while she took his children under her own immediate care. The death of the empress released him from his unnatural restraint, and he ascended the throne with no practical acquaintance with the mechanism of government, and no knowledge of the people whom he was called to rule. A determination to change everything that had existed under the previous reign, and to wreak vengeance on the murderers of his father, were the predominating influences that guided his actions; and his earliest measures, which were the disgrace of his father's murderers, and the pardon of all Polish prisoners, gave hopes of a good reign; but the capricious violence of character and incapacity for business which P. disclosed soon disappointed the hopes that he had awakened. No department of the state was free from his frivolous interference, and no class of the nation exempt from his arbitrary legislation. While he irritated the soldiery by vexatious regulations in regard to their dress, he offended the nobles by imperious enactments as to the ceremonials to be observed in his presence. His foreign policy was marked with similar caprice. After having adopted a system of neutrality in the war between France and the rest of Europe, he suddenly declared in favor of the allied powers, and sent an army of 56,000 men under Suwaroff into Italy. The success of his general encouraged him to send a second army of equal strength to cooperate with the Austrians; but their defeat 1799 induced P. to recall Suwaroff with the Russian troops: and having retired from the allied coalition without having given any reason for his conduct, he quarrelled with England, because its govt. would not comply with his whimsical demand for the surrender of Malta, and for his own recognition as grand master of the Order of Malta, and entered into close alliance with Bonaparte, then first consul. The jealousy and hatred of England by which both were actuated proved a powerful bond of union between them; and in furtherance of their scheme of uniting all the smaller maritime powers into one vast confederation against England, P. concluded a convention with Sweden and Denmark for the purpose of opposing the right insisted on by England of searching neutral vessels. The result was that the English govt. 1801 sent a fleet into the Baltic under Nelson to dissolve the coalition, at the close of March. P. was preparing to give material aid to the Danes, when a conspiracy was formed in St. Petersburg to put a stop to the capricious despotism under which all classes in Russia were groaning. The conspirators, including Count Pahlen, the most influential man at court, Gen. Beningsen, Uwarow, and many other distinguished nobles and officers, appear to have intended originally only to force P. to abdicate; but his obstinate disposition led to a scuffle, in which the emperor was strangled.

PAUL OF SAMOSATA, *sa-mŏs'a-tâ* : Bp. of Antioch : b. at Samosata near the beginning of the 3d c. With the bishopric, he held also the civil office of procurator decenarius, and by some means amassed wealth. Besides incurring some suspicions of wickedness, he was charged with arrogance and vanity, introducing pomp into religious services, and even encouraging his hearers to applaud him by waving handkerchiefs and shouting. He is chiefly known as a heresiarch, with reference to the Trinity and the Divinity of Christ. After three trials he was condemned and excommunicated by a council about A.D 268, but, owing to the favor extended to him by Queen Zenobia, he persisted in keeping his episcopal residence and state until the defeat of the queen, when he was further deposed by the Emperor Aurelian. His church was divided by his heresy, which for some time had followers, known as Paulians, Paulianists, or Samosatians. His doctrine was that God is a unit ; the Son and the Holy Spirit are respectively the energy or wisdom and the animating power of God, impersonal ; they were latent in Him until the creation, when they went forth into action, and may be figuratively called the Son and the Spirit. The man Jesus was, indeed, begotten of the Virgin Mary by the Spirit, to bring the great salvation, but had not a twofold nature ; the divine reason so actuated him that he was raised above ignorance and sin, and he may be called God or the Son of God. His pre-existence was only in the divine purpose.

PAUL (or PAOLO) VERONE'SE: see CAGLIARI, PAOLO.

PAUL THE DEACON: see PAULUS DIACONUS.

PAUL, VINCENT DE (SAINT) : one of the most eminent saints of the modern Rom. Cath. Church: 1576, Apr. 24—1660, Sep. 27; b. at Ranquines, in the diocese of Dax; of humble parentage. The indications of his ability led to his being sent to school at Toulouse. He became an ecclesiastical student, and was admitted to priest's orders 1600. On a voyage from Marseille to Narbonne, his ship was captured by corsairs, and he and his companions were sold into slavery at Tunis, where he passed through the hands of three different masters. The last of these, a renegade Savoyard, yielded to the pious exhortations of Vincent, resolved to return to the Christian faith, and with Vincent, made his escape from Barbary. They landed in France 1607. Having gone thence to Rome, he was intrusted with an important mission to the French court 1608, and continued to reside in Paris as the almoner of Marguerite de Valois. The accident of his becoming preceptor of the children of M. de Gondy, commandant of the galleys at Marseille, led to his being appointed almoner-general of the galleys 1619. It was at this time that the well-known incident occurred of his offering himself, and being accepted, in the place of one of the convicts, whom he found overwhelmed with grief and despair at having been compelled to leave his wife and family in extreme destitution. Meanwhile he had laid the founda-

tion of what eventually grew into the great and influential congregation of Priests of the Missions; an association of priests who devote themselves to the work of assisting the parochial clergy by preaching and hearing confessions periodically in those districts to which they may be invited by the local pastors. The rules of this congregation were finally approved by Urban VIII. 1632; and in the following year the Fathers established themselves in the so-called Priory of St. Lazare, in Paris, whence their name *Lazarists*. From this date, his life was devoted to the organization of works of charity and benevolence. To him Paris owes the establishment of the Foundling Hospital, and the first systematic efforts for the preservation of the lives, and the due education of a class theretofore neglected, or left to chance charity. The pious Sisterhood of Charity is an emanation of the same spirit, and Vincent was intrusted by St. Francis of Sales with the direction of the newly-founded order of Sisters of the Visitation. The queen, Anne of Austria, warmly rewarded his exertions; and Louis XIII. chose him as his spiritual assistant in his last illness. He was placed by the queen-regent at the head of the *Conseil de Conscience*, the council chiefly charged with direction of the crown in ecclesiastical affairs; and the period of his presidency was long looked back to as the golden era of impartial and honest distribution of ecclesiastical patronage in France. Vincent was not, in any sense of the word, a scholar, but his preaching, which (like that of the Fathers of his congregation of Lazarists) was of the most simple kind, was singularly affecting and impressive. He left no writings but the *Rules or Constitutions of the Congregation of the Mission*, 1658; *Conferences* on these Constitutions, 4to; and a considerable number of letters, addressed chiefly to the priests of the mission, or to other friends, on spiritual subjects. He died at St. Lazare, and was canonized by Clement XII. 1737. His festival is on July 19, the day of his canonization.

PAUL AND VIRGINIA: novel by Bernardin de Saint-Pierre, published in 1787. The story is in two parts, the first dealing with the idyllic friendship of Paul and Virginia, who grow up together, and the second with the dawning of their love for each other, with Virginia's death in shipwreck, and with Paul's death of grief. The style is delicate, the tone rather morbid; but the book has long been famous. It introduced into France the school of exotism or exoticism. Several operas have been written on the theme; one by Kreuzer, played at the Opéra Comique in 1791; another by Lesueur in 1794; and a third with libretto by Carré and Barbier, and music by Victor Massé, which was first played at the Théatre Lyrique in Paris, 1876, Nov. 15. The popular painting by Cot, commonly called *Paul and Virginia*, more properly is called *The Storm* and, possibly, was not intended to illustrate this story.

PAULDING, *pawl'ding*, HIRAM: naval officer: 1797, Dec. 11—1878, Oct. 20; b. Westchester co , N. Y.; son of John P. (q.v.), one of the captors, 1780, of Maj. André. He entered the navy 1811, Sep. 1.; was in the battle of Lake Champlain 1814, Sep. 11; and was given a sword and thanks of cong. Oct. 20; served in the Algerine war, and was made lieut. 1816, Apr. 27; cruised 1820–22 in the W. Indies, suppressing piracy; was in command of the schooner *Shark* in the Mediterranean 1834–37; and 1837, Feb. 9, was promoted to commander, and had charge of the sloop *Levant* 1839–41. He became capt. 1844, Feb. 29; was on the *Vincennes*, in the E. Indies 1846–7; and on the *St. Lawrence* 1849–50. He had charge of the navy-yard at Washington, D. C., 1853–55, and of the home squadron 1856–58. In this last service, 1857, Dec. 8, he broke up Walker's expedition against Nicaragua, taking him and 132 men at Punta Arenas in the harbor of Greytown, and sending them to the United States, an act for which Pres. Buchanan censured him, while Nicaragua gave him thanks and a sword. In 1861, Apr., he was appointed commander at the Norfolk navy-yard, and destroyed what public property there could not be protected. He was retired, 1861, Dec. 21; and 1862, July 16, was made rear-admiral on the retired list. He did service at the Brooklyn navy-yard 1862–65; was gov. of the naval asylum at Philadelphia 1866; and port-admiral at Boston 1869. He published *Journal of a Cruise among the Islands of the Pacific* (New York 1831).

PAUL'DING, JAMES KIRKE: author: 1779, Aug. 22—1860, Apr. 6; b Pleasant Valley, N. Y.; son of a farmer descended from the early Dutch settlers. Self-educated, and early developing a tendency to literature, he was a friend of Washington Irving, and wrote a portion of *Salmagundi*. During the war of 1812 he published the *Diverting History of John Bull and Brother Jonathan;* 1813, a parody of the *Lay of the Last Minstrel*, entitled *A Lay of the Scottish Fiddle;* and 1814, a more serious work, *The United States and England*, a defense against articles in the *Quarterly Review*. This work attracted the attention of Pres. Madison, and caused the appointment of P. as a member of the board of naval commissioners. In 1817 he published a defense of the southern states and of slavery in *Letters from the South, by a Northern Man;* 1819, a new series of *Salmagundi;* 1822, *A Sketch of Old England, by a New England Man;* 1824, *John Bull in America, or the New Munchausen*, satire on the writings of certain British tourists. This was followed by *Konigsmarke*, novel (1825); *Merry Tales of the Three Wise Men of Gotham* (1826); *The New Pilgrim's Progress* (1828); *Tales of a Good Woman* (1829); *Book of St. Nicholas* (1830). These works, mostly humorous and satirical, had various degrees of local popularity; but 1831 he produced *The Dutchman's Fireside*, a novel that was reprinted in England, and translated into French and Dutch; and 1832, *Westward Ho!* which attained similar popularity. These were followed by *Life of Washington* (1835), *Slavery in the United States* (1836). in

which the institution is defended on social, economical, and physiological grounds. He held at this period the lucrative post of navy agent at New York, and was by Pres. Van Buren appointed sec. of the navy. At the close of Van Buren's presidency, 1841, P. retired to a country residence at Hyde Park, N. Y., where he wrote *The Old Continental*, novel (1846); *The Puritan and His Daughter* (1849); and with his son, a volume of Plays and Fairy Tales. He died at Hyde Park.

PAUL'DING, John: 1758–1818, Feb. 18; b. New York, At the opening of the Revolution he entered the army, and, though captured three times by the British, served till its close. With Isaac Van Wart and David Williams, 1780, Sep. 23, he captured John André (q.v.), the British spy, near Tarrytown, N. Y., on his return from a meeting with the traitor Benedict Arnold. As leader of the party P. intercepted André, who first represented himself as a British officer and afterward showed a pass from Arnold. A search revealed the fact that André had concealed upon his person a plan of the West Point fortifications, and other important papers in Arnold's handwriting. Indignantly refusing an offer of a great reward for his liberation, the three patriots promptly delivered their prisoner at the American post at North Castle. They neither claimed a reward nor left their names. Gen. Washington was much interested in the case, and recommended congress to give a silver medal to each of the three soldiers. This was done and an annuity of $200 was granted. P. died in Staatsburg, N. Y. His remains are interred in the churchyard of St. Peter's near Peekskill, and the city of New York placed a monument over his grave 1827.

PAULI, *pow'lē*, Georg Reinhold: German historian: 1823–82; b. Berlin; studied philol. and philos. in Berlin Univ.; explored (1847) libraries in England and Scotland for the *Historical Memorials of Germany*, of Perth; 1849–52, special sec. of Bunsen, Prussian minister to England; 1855, asst. prof. Berlin Univ.; 1857 prof. of hist. at Rostock; 1859, the same at Tübingen; 1869 until his death, at Göttingen. Among his works are *King Alfred and His Place in the History of England* (1851; two English translations); *History of England* (1853–58), from the 12th c to the beginning of the 16th c., forming vols. III., IV., V. of the work begun by Lapenberg; *Scenes of Ancient England* (1860); *History of England since the Treaty of Peace*, 1814–15 (1864–67); *Simon de Montfort, Count of Leicester, Creator of the House of Commons* (1867); Critique of the *Confessio Amantis* of Gower, 3 vols. (1857). His severe criticism of the Würtemberg govt. in the Prussian Annual, about 1866, caused him to be retired to a small seminary of Schönthal, but general opinion was in his favor, and the Prussian govt. appointed him prof. of hist. in the Univ. of Marburg. Bohn's select library has a translation from Pauli entitled *Oliver Cromwell.*

PAULICIANS, *paw-lish'anz:* ancient sect of the Eastern Empire, who, by Rom. Cath. writers, are reckoned an offshoot of the Manicheans (q.v.). According to Peter of Sicily and Photius, the sect originated in the 4th c., in Armenia from two brothers, named Paul (from whom it is alleged to have received its name) and John. Others trace it to an Armenian named Paul, who lived under Justinian II. The P. were at all times treated with much suspicion, and repressed with great severity, by the eastern emperors; Constans, Justinian II., and Leo the Isaurian especially labored to repress them; indeed, excepting Nicephorus Logotheta (802–811), it may be said that all the emperors, with more or less rigor, persecuted them. Their greatest enemy, however, was Theodora (841–855), who, having ordered that they should be compelled to return to the Greek Church, had all the recusants cruelly put to the sword or driven into exile. A bloody resistance, and finally an emigration into the Saracen territory, was the consequence; and it is from the Paulician settlers in Bulgaria that the Manichean doctrines which tinged the opinions of most of the mediæval sects are supposed by Rom. Cath. historians to have found their way into the eastern provinces of the Western Empire. Even so late as the 17th c., according to Mosheim (II. 238), there was a remnant of this sect in Bulgaria.

A more probable view of the character and doctrines of the P. has been forcibly presented by such modern writers of high repute in ecclesiastical history as Gieseler and Neander. This assigns their origin to Constantine of Mananalis (near Samosata), an Armenian, in the latter part of the 7th c. (d. about 684), who had received a present of two volumes—one containing the four gospels, and the other the epistles of Paul—and who afterward assumed the name of Paul, in testimony of veneration for that apostle. The distinctive characters of his doctrine and that of his followers were the rejection of the worship of the Virgin, the saints, and the cross, denial of the material presence of Christ in the Eucharist, refusal of an ordained ministry, and assertion of a right freely to search the Scriptures. Their moral precept and practice, at least under Constantine, were pure and high. They were greatly averse to image-worship. They were currently understood to hold a doctrine of dualism, so that the charge of Manicheism, brought against them by their persecutors, was probably not wholly false, though much exaggerated. After 835, many of them who had previously been driven into Armenia, developed there among the Saracens an organization more political than ecclesiastical, and had able military leaders, and founded new settlements. After the opening of the 13th c. the P. disappeared from history; but were represented in branch or descendent sects in France and Italy, among which were the Patarini, Cathari, and Albigenses.

PAULINE, *paw'lin:* pertaining to the Apostle *Paul*, as, *Pauline* epistles.

PAULINE EPIS'TLES, n. *paw'līn:* fourteen epistles of the New Testament, 13 of which commence with the apostle Paul's name, the 14th opening abruptly without any intimation as to the writer, though the detached title 'The Epistle of Paul' has been prefixed to it. Its author was more probably Apollos than Paul. Of the other 13, five (Rom., Ephes., I and II Tim., and Titus) have only Paul's name attached; four (II Cor., Phil., Col., and Philem.) are from Paul and Timothy; two (I and II Thess.) are from Paul, Silvanus, and Timotheus (Timothy); one (I Cor.) from Paul and Sosthenes, and one (Gal.) from Paul and 'all the brethren that are with me': see PAUL, Apostle of Jesus Christ.

PAULINISM, n. *paw'līn-izm:* in *chh. hist.*, a term introduced to denote the body of teaching found in, or deducible from, the writings of St. Paul.

PAULI'NUS OF NOLA, *nō'lâ*, SAINT (PONTIUS MEROPIUS ANICIUS): consul, monk. and finally Bp. of Nola: 353–431; b. Bordeaux, of noble family. His father, a very rich prefect, placed him under tuition of the scholar Ausonius, and he became an accomplished rhetorician. In 378 he was appointed consul suffectus by the emperor, and the next year he went as consularis into Campania, where he became a devotee at the shrine of St. Felix. The influence of St. Ambrose led him to renounce the world and spend his great wealth in charity, and in churchly or other public benefactions, such as building a basilica at Fondi and an aqueduct at Nola. Having been ordained presbyter in Barcelona, 393, he, with his wife—now spiritual sister—led an ascetic life at Nola until 409, when he was chosen bishop. Among his scholarly but not remarkable writings were 52 epistles (some addressed to Augustine and Jerome), 32 songs, a metrical epistle to Ausonius, and some paraphrases of psalms. He encouraged pilgrimages, relic-hunting, and faith in miracles.

PAULINUS, *paw-lī'nŭs*, SAINT, Bishop of York and Rochester: first missionary to n. England: d. 643. He came to England with St. Augustine (first Abp. of Canterbury). Ethelburga, wife of Edwin (king of the Angles n. of the Humber to the Forth), dau. of Ethelbert of Kent, had been converted to Christianity. At her desire, St. P. was allowed to come to Northumbria 625. Her recovery from sickness in answer to prayer, and Edwin's vow in regard to a victory, favorably inclined him to the new religion. A council decided for it; idols were destroyed, and multitudes were baptized by St. P. He was made Bp. of York 628, but fled before an invasion of pagans 633, and d. in the see of Rochester. Bede, 50 years after, describes him as tall, slender, with an aspect venerable and majestic.

PAUL'IST FATHERS: fraternity of Rom. Cath. priests, formed by Isaac Thomas Hecker, New York, 1858. It is mostly, if not entirely, composed of Americans by birth, and its special object was to use methods adapted to the American people. The members are under one superior, and may leave the society at will; the rules are adopted by the brotherhood in council. The corporate name is 'The Missionary Society of St. Paul the Apostle, in the State of New York.' In carrying out their chosen work, the Paulists, though few in number, have left a clearly defined impress upon the course of the Catholic Church in America. It is chiefly due to them that a systematic and persistent endeavor to bring non-Catholics into the Church is now extensively organized among the diocesan clergy. Their example is stimulating other religious societies to fraternal emulation. In missionary work of this kind the Paulists are uncompromising in presenting the doctrines and claims of Catholicity, while, at the same time, they carefully avoid the polemical attitude which only arouses and exasperates religious prejudice. Another work in which they stand in the foremost rank is the promotion of temperance. Exhortation to total abstinence is characteristic of their mission preaching; and their printing-house in New York is the headquarters of the Publication Bureau of the Catholic Total Abstinence Society. The propaganda of the press was an early ambition of the Paulists. In 1865 they founded *The Catholic World*, a monthly magazine; in 1870, they established for young readers a bi-weekly, *The Young Catholic*, which is now a monthly under the name of *The Leader*; in 1896, they began to issue a quarterly, entitled, *The Missionary*, which serves as the organ of the non-Catholic missions. Beside these periodicals, their presses turn out, annually, hundreds of thousands of pages of devotional, homiletic and apologetic literature. Another feature of Paulist endeavor has been the observance, in public worship, of strict ceremonial, including only Gregorian music. At present the Paulists number about 45 priests, with 35 students and postulants. They have missionary houses in New York, San Francisco, Winchester (Tenn.), Chicago; and a house of studies at the Catholic University, in Washington, D. C.

PAULLINIA, n. *paw-lĭn'ĭ-ă* [after Professor S. *Paulli* of Copenhagen]: genus of plants, from the powdered seeds of some of the species of which stimulating beverages are made to a large extent in some parts of South America; the *Paullĭnĭă sor'bĭlĭs*, ord. *Sapindācĕœ*, yields the seeds from which the Guarana (q.v.) bread or Brazilian cocoa is prepared.

PAULOWNIA, *paw-lō'nĭ-â* [from the name of Anna *Paulovna*, dau. of Czar Paul I.]: genus of trees, ord. *Scrophularineœ*, tribe *Cheloneœ*. There is only one known species, Paulownia *imperialis*, native of Japan; a

large tree, in its general habit closely resembling the Catalpa; it has cordate opposite leaves covered with soft hairs, and bears large terminal panicles of pale-violet or blue and brown-spotted flowers early in spring. The numerous large, pointed capsules persist for one or two winters. Paulownia is a favorite tree for ornamental purposes and is much cultivated in Washington and in Paris, but it does not thrive in more northerly latitudes.

PAULSEN, *Powl'sen,* FRIEDRICHS, German philosopher: b. Langenhorn, Schleswig, 1846, July 16; d. 1908, Aug. 14. He was educated at Erlangen, Bonn, and Berlin, became a lecturer at the University of Berlin in 1875, and was made professor of philosophy and pedagogics there in 1873. Paulsen was a thorough Kantian, and found in that philosophy the basis for the philosophic thought of the future. He held that Kant has shown knowledge to be limited to the facts derived from the observation of the relations of phenomena in time and space. The power of values (or the good) is not demonstrable by science, but must be entrusted to faith. But science proves that there exists no scientific impossibility in belief in the indestructibility of that which possesses worth, of the freedom demanded by the will, and of a world beyond the reach of sense. Faith is in no danger of a real attack from science, but science may remove obstacles from the way of faith. The empirical view of the world remains incomplete and valid for only restricted human observation. Among Paulsen's more important works are: *Entwicklunggeschichte der Kantischen Erkenntnisstheorie* (1875); *Einleitung in die Philosophie* (1892; 7th ed. 1900; Eng. trans. 1895), a work of high literary as well as philosophic value; *Immanuel Kant* (1898); *Kant, der Philosoph des Protestantismus* (1899); *Schopenhauer, Hamlet, und Mephistopheles* (1900); *and Philosophia Militans* (1900; 2d ed. 1901), containing a vigorous reply to the *Welträtsel* of Ernst Haeckel.

PAULUS, *pow'lûs,* HEINRICH EBERHARD GOTTLOB: German rationalist theologian: 1761, Sep. 1—1851, Aug. 10; b. Leonberg, near Stuttgart. He studied oriental languages at Göttingen, and afterward in London and Paris. In 1789, he was called to the professorship of oriental languages at Jena, and 1793 became prof. of geology, on the death of Döderlein. Here he signalized himself by the critical elucidation of the Scriptures of the Old and New Testaments, so far as they presented oriental characteristics. The results of his labors may be seen in his *Philologisch-kritischen und historischen Commentar über das Neue Testament* (4 vols. Lüb 1800–04); *Clavis über die Psalmen* (Jena 1701): *Clavis über den Jesaias,* and other writings belonging to this period. In 1803 he removed to

Würzburg; 1808 to Bamberg; 1809 to Nürnberg; 1811 to Ansbach. During these changes, he had ceased to be a professor, and became a director of ecclesiastical and educational affairs, but in 1811 he accepted the professorship of exegesis and ecclesiastical history at Heidelberg. In 1819; he started a kind of historico-political journal entitled *Sophronizon*, in which he continued to write for about ten years. His contributions were marked by weighty sense, moderation, and knowledge of his various subjects, and won great applause. As a theologian, he is generally deemed the type of pure unmitigated rationalism—a man who sat down to examine the Bible with the profound conviction that everything in it represented as supernatural was only natural or fabulous, and that true criticism consisted in endeavoring to prove this. From his numerous writnigs, we select for mention the following: *Memorabilien* (Leip. 1791–96); *Sammlung der merkwürdigsten Reisen in den Orient* (7 vols. Jena 1792–1803); *Leben Jesu, als Grundlage einer reinen Geschichte des Urchristenthums* (2 vols. Heidelb. 1828); *Aufklärende Beiträge zur Dogmen-Kirchen und Religionsgeschichte* (Bremen 1830); and *Exegetisches Handbuch über die drei ersten Evangelien* (3 vols. Heidelb. 1830–33). P. lived long enough to see his own rationalistic theory of Scripture give place to the 'mythical' theory of Strauss, and that in its turn to be shaken to its foundations partly by the efforts of the Tübingen school, and partly by those of Neander and the 'Broad Church' divines of Germany. See P.'s *Skizzen aus meiner Bildungs und Lebensgeschichte zum Andenken an mein 50-jähriges Jubiläum* (Heidelb. 1839), and Reichlin Meldegg's *H. E. G. Paulus und seine Zeit* (2 vols. Stuttg. 1853).

PAULUS, *paw'lŭs* (or PAUL'LUS), LUCIUS ÆMILIUS: Rom. gen.: about B.C. 230–160; b. Rome. His father, Lucius Paulus, fell at Cannæ, his sister married Scipio the Great; and the Æmilian family for 250 years had many distinguished members. He was ædile B.C. 192, pretor B.C. 191, was made consul 182; and the next year, with 8,000 men against 40,000, overcame the Ligurians, corsairs living about the present gulf of Genoa. From his retirement he was entreated by the people to come forth 168, accept the consulship and the command in the then disastrous Macedonian war. At the battle of Pydna, the enemy's famous phalanx, with a wall of bucklers bristling with pikes, was impenetrable, until P. sent platoons into chance openings, attacking in flank and rear with heavier swords. A rout followed, the craven king, Perseus, fleeing to Samothrace, where he was forced to surrender, and, a year later, was chief captive in one of the grandest triumphal processions ever witnessed in the streets of Rome. Meanwhile P. had visited Greece, and, after settling the affairs of Macedonia, obeyed a decree of the senate in giving up 70 towns of Epirus to pillage, the soldiers entering them on false pretenses, and at the same time seizing 150,000 persons as slaves—a colossal crime, not in the heat of war but in cold blood, accordant with the pitiless Roman spirit, but

wholly discordant with the enlightened virtue of the best men of even that time, including P. himself. How far he was responsible does not appear. He was reputed to be humane to enemies. The spoils, in part those of the miserly Perseus, were so great in silver and gold that the Romans, it is said, were relieved from taxes for 125 years thereafter. But P., having always lived in unselfish simplicity, diverted nothing to his own emolument, and left an estate equivalent to only about $60,000 of our money. On the very days sacred to his triumphal pageant, he lost his two sons by his second wife, and said to the people, 'The man who led the triumph is as great an instance of the weakness of human power as he that was led captive.' His two discreditable acts as an individual, on record, are, first, the divorce of his first wife, against whom he confessed he could name no special faults; secondly, the inconsistency of ordering a statue of himself set up at Delphi, after all his teaching that 'a mortal should not be elated by prosperity and plume himself on overturning a city or a kingdom.' In his praise it is to be said that he disdained the arts of the demagogue, and, though a patrician, and strict in administration of his offices, he was loved and honored by the people for his honest speech and his virtues. At his funeral, representatives of the nations conquered by him assisted in carrying his bier, 'calling Æmilius their benefactor and the preserver of their countries.' He died at Rome. See *Plutarch's Lives;* and Livy.

PAULUS ÆGINETA, *paw'lŭs ĕj-ĭ-nē'ta:* famous Greek physician of the 7th c., b. in the island of Ægina. His period was during the conquests of the Caliph Omar. Of his life we know almost nothing more than that he pursued his medical studies first at Alexandria, afterward in Greece and other countries. His forte lay in surgery and obstetrics, and in the latter department his practice was great. He abridged the works of Galen, and was deeply read in those of Ætius and Oribasius, but used independent judgment in forming his conclusions. His descriptions of diseases are brief and succinct, also complete and exact. He often grounds his explanation of morbid phenomena on Galen's theory of the cardinal humors; while in surgery his writings abound with novel and ingenious views. His works—the principal commonly called *De Re Medica Libri Septem* (Lond. 1834)—have passed through many editions, of which the best is that completed at Lyon 1567, and they have also had many translators, of whom the best in English is Dr. Francis Adams.

PAULUS DIACONUS, *paw'lŭs dī-ăk'ō-nŭs,* or PAULUS LEVITA (both surnames from his ecclesiastical office): one of the most learned men of his time, and the greatest Lombard historian: about 725—prob. about 797; b. at Friuli, of a noble Lombard family. His father's name was Warnefrid. P. received a superior education at Pavia, at the court of the Lombard king Ratchis, and appears to have continued at court during the reigns of his successors, Aistulf and Desiderius, and to have accompanied

Adelperga, daughter of Desiderius, whose education he had conducted, to the court of her husband, Duke Arichis of Beneventum. For her he wrote, 781, after he had become an ecclesiastic, one of his principal works, his *Historia Romana*, a work of no authority, as it is a mere compilation from works which we possess, but which was greatly used during all the middle ages, as the many manuscripts, recensions, and continuations of it, attest. An ed. of the genuine text is still lacking, but a great part of it is given in Muratori's *Rerum Italicarum Scriptores, I.* (Milan 1728). In 781, Paulus became a monk of Monte Casino; but afterward went to France, and won the esteem of Charlemagne by his character and learning. He aided that monarch in his schemes for promotion of learning, and introduced the study of the Greek language into France. He made a collection of homilies from the best sources, at the emperor's desire, known as the *Homilarium*, often printed between 1482 and 1569, and translated into German and Spanish. At the request of Angilram, Bp. of Metz, he wrote a history of the Bishops of Metz, *Gesta Episcoporum Mettensium* (printed in Pertz's *Monumenta Germaniæ Historica*, II.), the first work of the kind n. of the Alps, but soon followed by many others. In 787, he returned to his convent, where he remained till his death. In the latter years of his life, he wrote his History of the Longobards (*De Gestis Langobardum, Libri* 6), but did not live to complete it, bringing down the history only to the death of Liutprand 744. There are several editions of this work; the best is in the work of Muratori. It is characterized by remarkable candor, and a style unusually pure for that age. The high repute in which this work was long held is attested by the great number of manuscripts and continuations. Paulus was likewise author of a number of theological works, and of some hymns and letters still extant.

PAULUS HOOK: formerly the name of the site of Jersey City, N. J., where fortifications were constructed by the Americans in 1776. The works were captured by the British in September of the same year, but on Aug. 19, 1779, a party of American soldiers, not much above 200 in number, under Lieut.-Col. Henry Lee (q.v.), retook and partially destroyed them. The British garrison was surprised, and 159 prisoners were taken, with an American loss of two killed and three wounded. Paulus Hook was again reduced by the British who held it until the end of the Revolution. The feat of Lee and his men was commemorated Nov. 21, 1903, by the dedication of a monument on the Paulus Hook battle-ground. The memorial, erected under the auspices of the Daughters of the American Revolution, is a rough-hewn granite shaft standing in the middle of a public square in Jersey City, and within the lines of the old fortification. An interesting feature of the dedication was the oration de-

livered by Gen. Fitzhugh Lee, of Virginia, a grandson of 'Light Horse Harry.'

PAUMOTA, *pâ-ô-mō'tâ*, or PAUMOTU, *pâ-ô-mō-tô;* native name of the Low Archipelago, a group of coral islands in Oceanica, lying in latitude 14°–40° s. and longitude 135°–149° w., east of the Society Islands; total area over 360 square miles; pop., about 7 000, principally Polynesians. Vegetation is scanty and the principal products of the group are cocoanut oil, copra, trepang, and pearls, and in the western islands are found the banana, the pineapple, and the bread-tree. The trade is chiefly with Tahiti. The seat of government and largest port is Fakarava, on the western island of Fakarava. The group was discovered in 1606 by Quiros, the Spanish explorer, and later visited by many others, notably by Cook, in 1769. In 1844 the islands came under French dominion and in 1881 were formally turned over to the possession of France.

PAUNCEFOTE, JULIAN, LORD: English diplomat: b. Munich, Germany, 1828, Sep. 13; d. Washington, D. C., 1902, May 24. He was educated at Marlborough College, and in Paris and Geneva. He began the practice of law in 1852, was, for a time, secretary to the colonial minister, Sir Samuel Molesworth, and in 1862 went to Hong-Kong where he practised law and became attorney-general in 1865. In 1872 he became chief justice of the Leeward Islands, in 1876 legal assistant under-secretary at the Foreign Office, and in 1882 permanent under-secretary of state for foreign affairs. In 1889 he was appointed minister to the United States, and 1893, when the office of ambassador was created, he was first to present his credentials as ambassador. His marked diplomatic ability and evident friendliness toward this country did much to bring about cordial relations between England and the United States. In 1890 he accepted the principle of arbitration for the Bering Sea dispute, and in 1892 signed the treaty; he managed the Venezuelan dispute skilfully, and negotiated a general arbitration treaty between Great Britain and the United States which was rejected by the Senate. He was most earnest in his efforts to abrogate the Clayton-Bulwer treaty, and negotiated and signed the treaty which supplanted it (see HAY-PAUNCEFOTE TREATY). He was British delegate to The Hague Peace Conference in 1899, and was raised to the peerage as Baron Pauncefote of Preston in recognition of his services there.

PAUNCH, n. *Pawnsh* [OF. *panche;* F. *panse;* It. *pancia*—from L. *pantĭcem*, the paunch, the belly: Tyrolese, *pantsch*, the belly; *pantschen*, to eat greedily]: the belly and its contents; the largest stomach of a ruminant: v. to take the contents out of the berry; to eviscerate. PAUNCH'ING, imp. PAUNCHED, pp. *pawnsht.* PAUNCHY, a. *pawnsh'ĭ*, big-bellied.

PAUPER, n. *paw'pėr* [L. *pauper*, poor: F. *pauvre*]: a poor person; one supported or assisted by his parish (See POOR, THE). PAU'PERISM, n. *-izm*, poverty; indigence; state of being destitute of the means of support. PAU'PERIZE, v. *-īz*, to reduce to a state of poverty or indigence. PAU'PERIZING, imp. PAU'PERIZED, pp. *-īzed*. PAU'PERIZA'TION, n. *-za'shūn*, the act or process of reducing to pauperism.—SYN. of 'pauperism': penury; want; need; poverty; indigence.

PAUPERISM [from Latin *pauper*, poor]. In the legal sense, a pauper is one who receives public relief, that is, one who is supported in whole or in part from funds raised by taxation. Pauperism, then, in the legal sense, is the condition of public dependency. The word pauperism popularly, however, is used to stigmatize a condition of willing, chronic dependency accompanied by considerable moral degradation. A pauper, in this sense, is a willing, chronic dependent, who is more or less supported by either public or private charity. It is evident that pauperism, in this latter sense, describes a condition of deep social and moral degradation, and must not be confused with legal pauperism, the receipt of more or less public relief. It is legal pauperism, or public poor relief, with which we are chiefly concerned in this article; but because those who apply for public relief are frequently more or less degraded, and because public relief is often given in such ways as to degrade or 'pauperize,' we shall also have to discuss more or less pauperism in the sense of social parasitism.

Of course, pauperism in both of the above senses must be sharply distinguished from poverty. Poverty is the condition in which income is not sufficient to maintain bodily and mental efficiency. Poverty is a relative term, and varies with the standards of living and efficiency maintained by a community. Only a small proportion of those living in poverty at any one time apply for or receive public relief—that is, become legal paupers; while a still smaller proportion become willing, chronic dependents upon public aid. Nevertheless, because poverty is the ante-room, so to speak, to pauperism, some of the facts of poverty will frequently need to be considered in order to afford a background to our picture of pauperism.

Early History of Poor Relief.—In the broad sense of needing public relief, pauperism has existed in all ages and in all countries. In primitive society the clan, or kindred group, was responsible for the support of all of its members; and weak, sick, or wounded members generally shared equally along with other members out of a common store. This primitive communism of the clan, however, did not prevent, in times of public scarcity or distress, the putting to death of the helpless. Among many savage and barbarous peoples, moreover, it is the regular custom to put the aged and the superflu-

ous or sickly children to death. Such customs, among savage and barbarous peoples are not to be interpreted as indicating an utter lack of sympathy; they are rather measures of self-protection on the part of the clan or tribe. Primitive peoples are always hard pressed by the conditions of existence; hence the exposure of weak or superfluous children, the putting to death of the wounded in time of war, the killing of the aged, and like customs are often practical necessities which are not incompatible with a high degree of mutual aid in other respects. The very conditions of life, however, which give rise to these customs prevented among primitive peoples the preservation of the weak and the development of anything like systematic poor relief.

At a later stage of development, the institution of slavery obviated the necessity of systematic poor relief. The mass of the laboring population, when slavery was at its height, were slaves; and as they were cared for in the patriarchal families of their masters, public relief was unnecessary. Moreover, those poor who were not slaves could usually find refuge from destitution in slavery through offering their persons as security for their debts; and it is said that the poor of classic antiquity dreaded this fate less than the poor of the present dread the modern poorhouse. With the breaking down of slavery and the patriarchal family, however, and with the increase in the number of freedmen in later classic antiquity, the problem of public poor relief emerges fully into view.

Among the peoples of antiquity, the Hebrews deserve especial mention for their system of poor relief. Not only could the Hebrew poor find refuge from destitution in slavery, but the Mosaic code contained more elaborate provisions for the relief of the poor than are found in the laws of any other ancient people. Chief among these provisions was that the poor were to have the produce of the land in the Sabbatical years (Ex. xxiii. 11). Similar provisions were in the Law of the Jubilee Year (Lev. xxv. 25-54), which provided that every 50th year the land which had passed out of the possession of those to whom it originally belonged should be restored to them, that Hebrew slaves should be freed, and debts remitted. The aim of this law was undoubtedly to prevent the growth of a class of landless poor. Unfortunately, there is no evidence that the Law of the Jubilee Year was ever historically observed. In Deuteronomy (xiv. 29) it is also provided that the poor shall share in the tithes with the priests; and (xxiv. 19-21) that they shall have the right to glean in the fields and to take any sheaves which might be forgotten. All of these legal provisions for the poor were to be supplemented by private almsgiving which is frequently enjoined in the Old Testament. Whether all of these provisions for the relief of the poor were strictly observed or not, it remains true that the Jews from the

earliest times have, in the care of their poor, been models for all other peoples.

It is especially, however, in ancient Rome that we find the public relief of the poor in ancient times carried out on a large scale. From the time of the Gracchi on we find numerous provisions for the relief of the poor, chief of which were the *leges frumentariae*, or 'corn laws,' which provided that free grain should be distributed to the poor or sold to them at a nominal price. This free distribution of grain continued and grew to enormous proportions in the first and second centuries of the Empire. It reached its height under Marcus Aurelius, when it is said that 500,000 persons received free donations of grain or other food. These donations of grain were made to the populace, not only in times of need, but upon many public festivals, such as the celebration of a triumph by a returning general. They were often, if not usually, made from political motives, either to win popular favor, or else to prevent political disturbances. Accompanied by much private almsgiving from similar motives, there can be little doubt that these food donations to the Roman populace were essentially demoralizing, as there is abundant historical evidence to show. While the institutions of slavery and clientage must have served to some extent to act as a preventive of pauperism, the above facts and many others seem to indicate that at certain periods pauperism was more widespread in ancient Rome than in any modern civilized country.

The advent of Christianity undoubtedly served to check the spread of public pauperism. While the Church inculcated charity as an elementary virtue, and while the primitive churches have been well characterized as, in a large degree, charity organization societies, nevertheless their almsgiving seems to have been relatively discreet, based as it was upon the personal sympathy and intimate knowledge made possible by the close association of their members. Moreover, in the earliest period, the churches were relatively poor, and had little to give, while their whole spirit was such as to encourage independence and self-help. Later, however, when the churches became rich and their membership large, the close relations between members disappeared and charity came to be dispensed with little knowledge of the circumstances of the recipients. The creation of great charitable funds within the churches also encouraged lavish and often unwise giving. One-fourth of the tithes of the Church, by decree of a council in 324, were set aside for the relief of the poor. Finally, after Constantine, the Church came to be recognized as the public organ for the relief of the poor. From that time onward to the Reformation, in all Christian countries, the relief of the poor was a function of the Church. How the Church discharged this duty we shall now see.

Poor Relief in the Middle Ages.—The institution of

serfdom in the Middle Ages checked the growth of pauperism, quite as the institution of slavery did in the ancient times. For the serfs were bound to the soil, and were looked after by their feudal lords quite as slaves were by their masters. Where serfdom flourished, widespread need of poor relief did not exist; but where serfdom was imperfectly developed, or when the serfs began to be freed, as after the Crusades, the Church had frequently to cope with an extensive problem of destitution. To meet this problem the Church at first set aside, as we have just seen, a part of the tithes. But when the great cathedrals began to be built, and other uses for such funds arose, the tithes were diverted to other purposes. The Church had in the meantime developed two institutions, the monastery and the hospital, which took over the burden of caring for the poor. The monasteries not only cared for the poor in their immediate neighborhoods, but fed and gave shelter to all the homeless who came to their gates. Their indiscriminate giving without doubt helped to create a crowd of vagrant beggars (see VAGRANCY), and aggravated rather than remedied the evils of pauperism. A similar work was performed by the hospitals, of which there were several thousands in the Europe of the Middle Ages. These were but little better than almshouses, in which the destitute sick, the aged, and orphan children were kept and cared for. During all the Middles Ages, and in some countries beyond the Reformation, these two institutions continued to be the Church's chief agencies for the care of the poor. But in the meantime the Church had developed the doctrine that almsgiving was a means of grace to the giver, which powerfully stimulated voluntary charity. The rich nobles and prelates frequently imitated the monasteries in feeding hundreds at their gates, while indiscriminate giving, 'to win for themselves the favor of God' was common among all classes of the well-to-do. It is needless to say that pauperism did not diminish but rather increased under such methods. Indeed, the thought of the prevention or cure of pauperism was remote from the charity of the Middle Ages.

The Church continued to be the public relief agency in all Christian countries down to the Reformation. The interferences of the civil government in the problem of poor relief were largely for the sake of suppressing vagrancy, or else to aid the Church in the performance of its functions. Thus Charlemagne in 806 forbade the passing of beggars to and fro through the country and ordered that the clergy, nobles, and all estates should care for their own poor.

The break-down of the system of Church charity in the countries which accepted the Reformation was largely due to the dissolution of monasteries and hospitals and of the religious orders connected with these institutions. But it is also to be ascribed to many

economic changes which threw upon the Church such a mass of pauperism that it was unable to meet the situation. Finally, the Church was inherently unfitted to perform the function of public relief agent; hence, it was inevitable that sooner or later it should give way to the civil authorities.

As we approach modern times the enormous material available for the history of pauperism and poor relief in civilized countries makes necessary some selection. We shall accordingly confine ourselves to the four principal countries of England, France, Germany, and the United States, as their systems of poor relief are best organized and most instructive. The history of pauperism and relief in England will be noted with some fullness, as it is of more direct interest to English-speaking countries.

History of Poor Relief in England.—The first English statutes on the relief of the poor were designed simply to prevent vagrancy and to force upon each parish, or local church, the relief of its own poor. The earliest of these statutes was that of 1388 (12 Richard II.), which forbade vagrancy under severe penalties, and ordered each parish to care for its own impotent poor. Many other similar statutes were enacted; one of Henry VIII. (1531) provided that the impotent poor might be licensed to beg within a prescribed area. After the dissolution of the monasteries and hospitals under Henry VIII. the problems of vagrancy and destitution became greatly aggravated, and positive measures were taken in a law of 1536 (27 Henry VIII.) for their relief. It was provided that the mayor of every town and the church wardens of every parish should collect alms every Sunday in the churches, and that with this sum those not able to work should be relieved and the able-bodied be set at work. This act Ashley calls 'the real commencement of the English Poor Law.' It certainly marked the transition from an ecclesiastical to a secular system of poor relief.

Under Elizabeth the whole system of poor relief was gradually transferred from the ecclesiastical to the civil authorities. In 1573 overseers of the poor were appointed in each parish, and a tax known as the 'poor rate' was levied and collected by them to support the impotent poor and to set the able-bodied at work, The various enactments of Elizabeth for the care of the poor were systematized and unified in the famous statute of 1601 (43 Elizabeth), which is still the basis of the English Poor Law. This law divided the recipients of relief into three classes: the able-bodied, those unable to work, and children. For the first class, only work was to be furnished; for the second, necessary relief was to be provided, especially in almshouses; while children were to be cared for by apprenticing them out. The unit for poor relief was to be, as before, the parish.

PAUPERISM.

The law of Elizabeth worked well until it began to be tampered with. It was first modified in 1662 by what was known as the 'Settlement Act,' which provided that the parishes had to relieve only those destitute who had a legal residence within their bounds; and a legal residence was made very difficult of acquirement except by birth. This law resulted in many cruelties to the poor, but was not modified until 1795. In 1697 the first 'workhouse' was erected at Bristol, the idea being that the poor should in part support themselves while in poorhouses. The Bristol workhouse being successful, an act was passed in 1723 authorizing parishes to unite for their erection wherever needed. At the same time it was ordered that any poor person refusing to enter such a workhouse could be denied assistance elsewhere. Thus was established the 'workhouse test,' which for a time greatly reduced the number of public paupers in England.

The first considerable departure from the principles of the Poor Law of Elizabeth, however, came in 1782, when an act known as Gilbert's Act was passed, which provided that only the old, the infirm, and children should be sent to the workhouse, and that the able-bodied should be found work near their homes, and that any deficiency in their wages should be made up by a grant from the relief funds. This opened the way for what is known in the history of English poor relief as the 'allowance system.' This was started in 1795 by the Berkshire magistrates, who inaugurated a plan of relieving, out of the poor funds, all poor families whose income was judged to be insufficient, the amount of the allowance being regulated by the price of wheat and the size of the family. The example thus set quickly spread over all England. While the plan was an humanitarian one, the results were most unfortunate. The number of public paupers increased enormously, wages fell, and the poor lost their efficiency as laborers and their self-respect. The amount expended for poor relief, moreover, increased from £2,004,238 in 1783 to £7,870,801 in 1818; while the per capita taxation for poor relief increased nearly six times from 1750 to 1818.

In 1832 a commission was appointed by Parliament to investigate the administration of the Poor Laws. Their report disclosed an unbelievable state of public corruption, and resulted in the reform law of 1834, known as the 'Poor Law Amendment Act.' This act centralized the administration of the Poor Law in the hands of three commissioners, who had extensive powers over local authorities; authorized the division of the country into districts of convenient size, known as 'Poor Law Unions,' to take the place of the parishes in the administration of poor relief, over each union being a 'Board of Guardians' as the responsible local authorities; finally it declared relief outside the work-

house for the able-bodied illegal, and required the erection of at least one workhouse in every Poor Law Union.

The present English system of poor relief follows the lines laid down in the act of 1834. The powers of the Poor Law Commission are now (since 1871) vested in the Local Government Board. This Board issues orders and regulations to the local authorities, inspects and supervises local administration, especially the workhouses, audits all accounts of local officials, and finally has power to discharge all local officers. There are 650 Poor Law Unions in England, over each of which is an elective Board of Guardians who are responsible for the carrying out of the law, the administration of the workhouse, etc. Both men and women serve upon these Boards of Guardians, and both sexes exercise the franchise in electing them.

The principal funds for poor relief still come from local taxation, though grants from the central government are made for the care of certain classes, like the insane, and for the erection of certain institutions, like schools for dependent children, which are undertaken by several unions in co-operation. 'Outdoor Relief,' or relief outside of an institution, is granted to able-bodied only under exceptional conditions, though in times of public calamity or industrial depression outdoor relief may be granted by cities to the able-bodied, provided one-half of it is given in the form of work. The workhouse, however, still remains the fundamental institution in English poor relief. An effort is made to concentrate the relief of the able-bodied in the workhouse, though as a matter of fact the workhouses are mainly filled up with aged and infirm persons who are permanently dependent. The English workhouses are models of cleanliness, have a thorough classification of inmates, but are strict in discipline and somewhat prison-like.

On the whole, the English poor relief system is considered to be the best of any country in the world. The efforts of the reformers of 1834 to reduce pauperism have been in a large degree successful. In 1849 the number of paupers in England on a single day was 1,088,659, of which 955,146 were outdoor paupers and 133,513 indoor paupers. That is, 6.27 per cent of the entire population were in receipt of relief on an average day in 1849. In 1900, on the contrary, there were only 577,122 outdoor paupers and 215,377 indoor paupers (a total of 792,499), which was but 2.5 per cent of the total population. The latest tendency, however, in England is towards an increase in the number of those receiving outdoor relief.

Poor Relief in France.—The French system of poor relief differs from the English system in many ways. Its three chief characteristics are (1) that relief is always given in the home of the needy person, unless it is imperative that it be given in an institution; (2) that private funds and efforts are under official

management, that is, it is a system of combined private and public charity, but under official control; (3) that no legal 'right to relief' is recognized as it is in England, except in the case of the insane, deserted children, and medical aid.

France, after the Reformation, remained the chief seat of Church charity; and the system remained an ecclesiastical system down to the 19th century. The beginnings of the present system date from the Revolution, when in 1791 the Constitution established the principle of State control, and in 1793 the foundations and endowments for the poor were confiscated by the Convention. Nothing came, however, of the proposed Revolutionary reforms, and the Church soon again came to control, subsidized by the State. In 1795 local boards of charity *(bureaux de bienfaisance)* were established with the Sisters of Charity in charge of the distribution of relief. These local boards of charity have persisted down to the present time, and form the framework of the French poor relief system. In 1886 all places of public relief were united under a central board known as the 'Directoire de l' Assistance Publique.' This board has supervisory powers over all forms of public relief, thus in some measure approximating the centralization of the English system. The whole system of relief in France is now under State control and is almost completely secularized.

The *bureaux de bienfaisance* now exist in about 16,000 communes, though in many of the smaller communes they have never been organized. They consist of elected and nominated members, including always the mayor and municipal councillors. The work of relief is still mainly in charge of the Sisters of Charity, but they do not determine who shall be the beneficiaries. Each case is carefully investigated by the bureau, and, if found worthy, relief is granted in the form of a small monthly pension, unless admission to an institution is necessary. Careful records are kept and the list of beneficiaries is frequently revised.

The funds for poor relief in France are derived largely from endowments and from voluntary contributions; also from special taxes, such as the tax on the gross receipts of all places of amusement; and finally, from grants from the public treasury. In 1898, the 15,827 *bureaux de bienfaisance* in France extended aid to 1,534,780 persons.

Poor Relief in Germany.—The leaders of the Reformation in Germany regarded poor relief as a civil rather than an ecclesiastical function, and advocated that it be undertaken by cities and communes. Steps were taken along this line by a number of cities, but the unsettled political condition of the country frustrated all attempts at uniform organization of relief. Even at the beginning of the 19th century poor relief in Germany was still in a chaotic condition, some cities having organized

public relief, others having private relief systems. It was not until Elberfeldt, a manufacturing town of Rhenish Prussia, organized its famous relief system in 1852 that the way was opened up for anything like uniform practice in German cities in respect to dealing with pauperism. The credit of originating the 'Elberfeldt System' seems mainly to belong to Daniel von der Heydt, who was mayor of the city. The city was divided into 364 sections, over each of which was appointed a visitor *(Armenpfleger)*. Fourteen of these sections formed a district, over each of which is an overseer *(Vorsteher)*. The visitors of each district meet together with their overseer to discuss cases and decide upon measures of relief once every two weeks. Their decisions are communicated to the municipal board, consisting of the mayor, representative members of the council, and representative citizens, who distribute the relief. The visitor, then, is not an almoner in the sense that he gives material relief to the dependent family; he is rather a sort of quasi-guardian of the family, who investigates the conditions which led to its distress, recommends the appropriate relief, and acts as friend and counsellor to the family. The idea is that there should be careful investigation of each case of need and consistent supervision during the period of dependency, with a view to helping the dependent person or family regain economic independence. The relief granted is in the form of money and is granted for two weeks at a time. The visitors, overseers, and members of the municipal board are all unpaid, but the work is not supposed to be such as to interfere with a man's business, no visitor having more than four poor families under his care.

The 'Elberfeldt System' is, then, a public relief system, characterized by the extensive use which it makes of private citizens in the carrying out of an elaborate and scientific plan, not so much for the relief of distress, as for the cure of pauperism. The success of the Elberfeldt System was marked from the first, and it has gradually spread to the principal cities of Germany and of German Austria. While there is no general law for the German Empire, the legal obligation to give relief to the destitute is recognized, and the law of 1870 gives to each commune and municipality the right to determine how its own poor relief shall be organized. The leading cities of Germany have adopted the Elberfeldt System, with slight modifications in some instances. While the system is not yet universal in Germany, it seems to lack only a general law and central supervisory board in order to make it so.

While the Elberfeldt System has not been copied in any English-speaking country, many of its leading features have been adopted by the Charity Organization Societies (q.v.).

The notable work of private charity in Germany, especially of the Inner Mission, can here only be referred to.

In 1885 there were 1,367,347 persons relieved by the public officials, of which 1,078,921 were relieved at home, and 288,426 in institutions. This is not counting those who received medical relief in the hospitals and the insane in asylums.

Poor Relief in the United States.—The early development of poor relief in the United States rests upon the English poor law. The colonists were acquainted with the statute of Elizabeth, and the legal obligation of each community to support its destitute was generally recognized. The first mode of relief employed was undoubtedly the relief of the poor in their own homes. When there were only a few helpless dependents they were boarded out with some farmer: when the number of these increased an almshouse or poorhouse was built, usually by the town in New England, by the county in the rest of the country. The poorhouse thus became, as in England, the fundamental institution in poor relief. Inasmuch as each state has its own poor laws, the conditions of this institution and of public relief generally in the United States vary greatly.

At first the poorhouse was a public catch-all for all classes of dependents—the sick, the aged, the deaf, the blind, the insane, the epileptic, the feeble-minded, the vagrant, destitute, and neglected children; the care of all of these with the management of the poorhouse being usually let out by contract—at so much per head. This condition of affairs still obtains in many belated communities, though in general the progress during the 19th century has been wonderful. Most states have hospitals for the insane, schools for the deaf and the blind, and a number have colonies for the epileptic and feeble-minded and care directly for dependent children. Indeed, the development in public charities in the most progressive states of the Union is not inferior to that of the most advanced countries of Europe.

About a dozen of the more progressive states in matters of public relief have supervisory boards of charities and corrections. Their duties are to inspect and supervise all the public charitable and correctional institutions of the state, and to advise the governor and the legislature in regard to legislation concerning the same. They have no executive functions. Such state boards, where well organized, have been able to bring about many improvements in the system of public charities. Another type of state board exists in about a half dozen states, known as the State Board of Control. This is simply a common board of trustees for all the State's institutions, having full executive powers over them. It seems ill-adapted to American political conditions, as it is liable to become an engine of partisan politics.

The problem of poor relief in the great cities of

America has been met mainly by private charity. A number of the principal cities, such as New York, Philadelphia, and St. Louis, have abolished public outdoor relief to the poor, and all relief to the poor in their own homes is given under the supervision of the local Charity Organization Society which aims to co-ordinate all existing relief agencies, so as to prevent duplication.

The great development which private charity has had during the last hundred years both in the United States and in European countries can only here be mentioned. In the United States private charity covers every field occupied by public charity, though the tendency is for private charity to deal chiefly with the temporary cases of destitution, leaving to public charity the care of permanent cases. The amount expended by private charities in the United States probably exceeds the amount expended by public charities, which latter is over $100,000,000 annually. The most notable movement in private charity in recent years is the organization of Charity Organization Societies in practically all of the large cities of the English-speaking world. The growth of educational societies for the study of questions of pauperism and relief and kindred topics is another notable movement of the times. The chief of these societies in the United States is the National Conference of Charities and Correction.

The Extent and Causes of Pauperism.—According to the Census Bulletin of 1904 there were, in the United States on Dec. 31, 1903, 81,764 paupers in almhouses. During the year 1904 there were cared for at different times in the almshouses, 163,176 different individuals. These figures, however, give no idea of the actual extent of pauperism in the United States. To them must be added the immense number of paupers cared for in special institutions, both public and private, and the even greater number relieved in their own homes by public officials or private agencies.

Over 500,000 dependents are, according to the census (1900), supported in the benevolent institutions of the United States, public and private. In large cities it is frequently the experience that from 10 to 20 per cent of the population receive relief within a single year. Upon the basis of these and similar facts, conservative estimates place the number who receive relief in the United States in a single year, from both private and public sources, at approximately 4,000,000, or five per cent of the population. Hunter estimates that there are at least 6,000,000 besides those who receive relief who live below the poverty line, making a total of 10,000,000 in poverty in the United States.

Some statistics of public relief in European countries have already been given. It is highly probable that in nearly all European countries the relative amount of pauperism greatly exceeds that of the United States. Mr. Charles Booth found that nearly 30 per cent of the

should be cared for in suitable institutions. (9) Vagrants, inebriates and vicious persons should be sent on indeterminate sentences to reformatories. (10) Poor children should be amply protected by the state, both in matters of labor and education; and especially should dependent and neglected children be cared for and placed in good homes. (11) Constructive and preventive work, such as better housing, better sanitation, parks, playgrounds, public baths and gymnasiums, should be carried on wherever needed. (12) Industrial insurance, old age pensions and free employment agencies are advocated as preventive measures.

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PAUSANIAS, *paw-sā'nĭ-as:* famous Spartan regent and general, son of Cleombrotus, and nephew of Leonidas; d. about B.C. 467. He commanded the confederate Greeks in the important battle of Platæa B.C. 479, in which the Persians were totally routed, and their leader, Mardonius, slain. He then marched his troops against Thebes, and compelled the inhabitants to give up the chiefs of the Persian party to him for punishment. Elated by this victory, however, he became extremely haughty and vainglorious, took all the credit to himself, and allowed none to the Athenian generals, Aristides and Cimon. Nevertheless, he continued his conquests, capturing Cyprus and Byzantium. Then he began to be false to Greece. He entered into secret

negotiations with Xerxes, with the view of becoming ruler, under the Persian monarch, of the whole country, and in his journey through Thrace even adopted the dress and luxurious habits of a Persian satrap, and surrounded himself with a body-guard of Persians and Egyptians. Being recalled, on account of these things, by the Spartans, his former services procured his acquittal. He then returned to Byzantium, where he renewed his traitorous intrigues, was expelled from the city for a criminal assault upon a Byzantine lady, withdrew to the Troad, and there continued his treachery. He was a second time called to account by the Spartan ephors, but again escaped, though with greater difficulty. Yet his passion for the sovereignty of Greece, even at the expense of the national liberties, once more led him into treachery. He tried to stir up the Helots, but was taken in his own net. A Helot betrayed him. When P. found his position desperate, he took refuge in a temple of Athene. Hereupon the magistrates caused the people to block up the doors of the temple with heaps of stones, and left him to die of hunger, his own mother (it is said) depositing the first stone.

PAUSA'NIAS: eminent Greek antiquarian writer: b. in the 2d c., native probably of Lydia in Asia Minor. He travelled through almost all Greece, Macedonia, and Italy, also in Asia and Africa; and composed from his observations and researches an Itinerary, *Hellados Periēgēsis*, in ten books, describing the different parts of Greece, and giving an account of the monuments of art and of the legends connected with them. He attempts little of art-criticism properly so-called; he is rather a cataloguer or enumerator. His style is not pure; but in matters of his own observation he is most trustworthy, and his work is, on many subjects, one of our most valuable sources of information. There are numerous editions; the oldest printed Venice 1516 by Aldus; the most recent by J. H. C. Schubart and C. Walz (3 vols. Leip. 1838–40). Translations of P. exist in English, German, and French.

PAUSE, n. *pawz* [F. *pause*, a halt or stop—from L. *pausa;* Gr. *pausis*, a pause, a rest: comp. Sw. *pusta*, to take breath: Norw. *pusta*, to rest awhile]: a cessation, intermission, or rest in something, as in labor, reading, speaking, etc.; a cessation proceeding from doubt, suspense, or fear; a stop or rest; a musical sign which indicates that silence is to be prolonged: V. to stop; to halt; to cease for a time either to speak or act; to deliberate. PAUS'ING, imp.: ADJ. ceasing for a time. PAUSED, pp. *pawzd*. PAUS'INGLY, ad. *-li*, after a pause; by breaks. PAUS'ER, n. *-ėr*, one who pauses.—SYN. of 'pause, n.': stop; suspense; doubt; break; end of a paragraph; halt; rest; hesitation; point;—of 'pause, v.': to stay; wait; delay; intermit; tarry; demur; hesitate.

PAVE, v. *pāv* [F. *pavé*, a paving-stone; *paver*, to pave —from mid. L. *pavārĕ*, to pave—from L. *pavīrĕ*, to beat or ram down: L. *pavimentum*, a path or floor made dense by beating and then laid with stones: Gr. *paiō*, I strike]: to make a hard level surface by laying it with stones or other solid material; to cover with stones or flags to make the surface level and hard; to prepare the way or passage. PA'VING, imp. flooring with stones: N. the act of laying with stones; a floor of stones. PAVED, pp. *pāvd:* ADJ. laid firmly with stones or other solid material. PAVER, n. *pā'vėr*, one who paves. PAVIER, n. *pā'vĭ-ėr*, or PA'VIOR, n. *-ĭ-ėr*, one whose occupation is to pave. PA'VIORS, n. plu. *-ėrz*, a building term for thin broad bricks used for paving. PAVEMENT, n. *pāv'mĕnt* [F.—L.]: wood, or other material, adapted for the purpose, and laid as flooring, footpath, or roadway (see below). PAVING BOARD, a number of persons in whom is vested the superintendence and management of the paving of a city, town, or district. PAVING-STONES, large prepared stones for paving. TO PAVE THE WAY, to do something to facilitate the introduction or completion of a thing.

PAVE'MENT: stones, or brick, etc., used for flooring of halls, kitchens, and other apartments, and frequently for footpaths; also the stone, wood, or other covering of the roadway of streets. The stones used vary in different districts, according to the geological formation of the neighborhood. P. should be carefully laid on a solid dry foundation, and set in a good bed of concrete or lime, and any joints should be pointed with cement. It may be laid also on small dwarf walls of brick, built to support all the edges: this is a good method for keeping a stone floor dry.

PAVING OF STREETS is of early date, and is necessary to any considerable degree of traffic, and is a requisite of advanced civilization. The Romans paved their streets in the same elaborate and solid manner in which they paved their highways: see ROADS. Portions of the ancient P. of the streets of Rome are in use at the present day, and the P. of Pompeii remains entire. It is laid with large blocks of stone of polygonal shape (like Cyclopean masonry), very carefully fitted together, and of considerable depth, and below there is a carefully prepared basis, often of several distinct strata. Some of the Italian towns—Florence, e.g. —still have pavement of this description, and no footpavement.

The mediæval cities almost all were unpaved till about the 12th c., when the main streets of the chief towns began to be paved with stone. Of stone pavements among the moderns the earliest form was the 'cobblestone' P., of rounded bowlders bedded in the natural surface or in gravel or sand. Roughly-squared blocks in time superseded bowlders, but the wide and irregular joints admitted water to the subsoil, and, as in the cobblestone P., the mud worked up and the stones sank irregularly. The necessity of interposing a bed of gravel or other suitable material between P. and subsoil then was recognized, and at first 6 in., later 12 in., of broken stone was laid as foundation

for the blocks. Blocks 4½ to 7½ in. broad first were used, but blocks of less width were soon seen in practice to afford a better foothold for horses and to have less tendency to rock on the bed: 3 in. was then adopted as the best width for paving blocks. In time concrete superseded broken stone as the foundation. Stone pavements in New York are now laid on a concrete foundation of 6 in. The blocks are of granite, of uniform dimensions—4 in. wide, 10 in. long, 12 in. deep, and they are so laid as to break joint. Over the concrete a thin bed of sand is strewn. On this the courses of blocks are laid square across the street; at street crossings they are laid diagonally, so as to afford good footing to horses passing either way. The spaces between the several courses and between the ends of the stones are filled with clean gravel, and the whole surface rammed; then a composition of coal-tar, pitch, and creasote oil is poured hot into the joints; finally, the pavement is covered with fine gravel.

Wood pavements have mostly gone out of use in the United States: since 1871 different forms of an improved wood P. have been employed in London, and that style of P. is still much used in the British metropolis. The plank foundation has been superseded by a layer of concrete; on this the wood blocks, which are rectangular, are bedded with the fibres vertical, thus constituting a slightly elastic wearing surface on a rigid foundation. The joints are filled with a grout of cement and gravel; sometimes the surface of the wood P. is dressed with a hot bituminous compound, and covered with fine clean grit. Such wood pavements are said to be of 'mineralized wood.' Different sorts of material are used. Pitch-pine and the harder red and yellow deals are the most durable, but are apt to become slippery on the surface from wear; on the whole, either Memel or Swedish yellow deal seems to be regarded by British engineers as the best material. A wood P. lasts about six years in London.

Asphalt was employed for street paving first in Paris 1854, and has since come into use in a very great number of places. The material used throughout Europe is generally a hard limestone naturally impregnated with bitumen, found in certain localities in Switzerland. In the United States asphalt pavements are made of this material, of similar kinds of bituminous rock found in W. Va. and elsewhere, and of artificial combinations of Trinidad or other bitumens with calcareous or silicious substances. The street, having been properly graded, is covered first with a layer of concrete. Over this, in some systems of asphalt paving, is spread a layer of Trinidad bitumen, broken into small pieces, which is then smoothed and consolidated by rolling over it a heavy iron cylinder kept hot by fires inside. Then follows a layer of asphalt rock, powdered, or of an artificial compound; this is applied hot (150°–200°), and spread evenly with a rake by skilled workmen for the whole width of the street to a thickness about $\frac{2}{5}$ greater than the finished coating is intended to be. Ramming is then commenced with light blows to insure

equality of compression throughout, and is continued with increased force till the whole is solidified; the surface is then smoothed by moving over it the iron cylinders heated to a dull redness. A few hours after the completion of the work the P. is ready for traffic.

The wear of an asphalt P. is very slow. One in Cheapside, London, after 14 years of use under exceptionally heavy traffic, was reduced, where not repaired, from its original thickness of 2¼ in. to 1⅜ in., and even that reduction was in great part the result of compression.

When either dry or wet the asphalt P. affords good foothold for horses, but when beginning to get wet or when drying, it is 'greasy' and slippery; but this is due probably to dirt on the surface and not to the nature of the material. Sand is strewed over an asphalt P. to remedy the slipperiness; but sand tends to wear out the asphalt: great cleanliness is the best remedy. The asphalt P. is the cleanliest of all pavements; it is noiseless except for the clatter of the horses' feet on it. Compared with other kinds of pavements with regard to the liability of horses slipping and falling on it, asphalt has been shown by actual test to be safer than granite in the proportion of 191 to 132; but, as to the item of slipperiness, the 'improved wood' P. is superior to either in the proportion of 446 to 191 or 132.

The great obstacle in the way of really good pavement in modern streets is the necessity of frequently breaking it up for laying and repairing of pipes for gas, water, electricity, etc. The true remedy—and, in the end, the cheapest—would be to have, in the chief streets at least, sub-ways or tunnels for drains, pipes, and wires, accessible without breaking up the pavement.

PAVIA, *pâ-vē'â:* province in Lombardy, Italy; of irregular form, about 40 m. long and at its narrowest 10 m. wide; 1,292 sq. m. The surface is generally level and the soil is remarkably productive. The principal rivers are the Po and the Ticino. Commercial facilities are afforded by two large canals. The live-stock interest is highly developed, and fruit of various kinds abounds. The principal products are silk, cheese, and cattle. The city of Pavia (q.v.) is the capital. The province comprises nearly 200 communes. Pop. (1891) 494,748; (1901) 496,069.

PAVI'A: city of n. Italy, cap. of the province of P.; on the left bank of the Ticino, 20 m. s. of Milan, 3 m. above the confluence of the Ticino and the Po. A covered bridge of eight arches connects the city with the suburb of *Borgo Ticino*, on the right bank of the river, and from this bridge the *Strada Nuova* or *Corso*, the principal thoroughfare, leads n. to the outskirts. The city is large, surrounded by walls, and has an imposing appearance, bearing the impress of antiquity. In former times, it was called the 'city of a hundred towers;' but the palace of Theodoric, and the tower where Boëthius wrote the treatise *De Consolatione Philosophiæ*, are no longer standing; among the remaining ones are those of Beleredi and Del Maino, each 169 ft. high. Its oldest church, oldest perhaps in

Italy, is that of San Michele, whose date of foundation is uncertain, but which is mentioned first 661. The cathedral, containing some good paintings, was begun 1484, but never finished. In a beautiful chapel attached to it are the ashes of St. Augustine, in a sarcophagus ornamented with 50 bassi-rilievi, 95 statues, and numerous grotesques. In the Church of San Petro in Ciel d'Auro are deposited the remains of the unfortunate Boëthius. The Certosa of P., the most splendid monastery in the world, is 4 m. n. of the city. It was founded 1396, contains many beautiful paintings, and abounds in the richest ornamentation. It has an octagonal cupola, painted ultramarine and enamelled in gold. It was sacked by the French 1796. The monastery church is in the form of a Latin cross, 249 ft. long and 173 ft. wide. The Univ. of P., said to have been founded by Charlemagne 774, was one of the most famous seats of learning during the middle ages. Its efficiency was much increased by Galeazzo Visconti, who bestowed many privileges on it 1396. It consists of numerous colleges, and attached to it are a library of 120,000 vols., numismatic collection, anatomical, nat. history, and other museums, botanic garden, school of the fine arts, etc. The univ. is attended by about 700 students. It has numbered among its professors Alciati, Fidelfo, Spallanzani, Volta, Scarpa, Foscolo, and Monti. The other chief edifices comprise private palaces, theatre, gymnasium, etc. P. has good trade in wine, rice, silk, and cheese.

P., the anc. *Ticinum* (afterward *Papia*, whence the modern name), was founded by the Ligurii; it was sacked by Brennus and by Hannibal, burned by the Huns, conquered by the Romans, and became a place of importance at the end of the Roman empire. Then it came into the possession of the Goths and Lombards, and the kings of the latter made it cap. of the kingdom of Italy. It became independent in the 12th c., then, weakened by civil wars, it was conquered by Matthew Visconti 1345. Its history since is merged in that of the conquerors of Lombardy. Here, 1525, the French were defeated by the imperialists, and Francis I. (q.v.) taken prisoner; but 1527, and again 1528, it was taken and laid waste by the French. It was stormed and pillaged by Napoleon 1796, and came into the possession of Austria by the peace of 1814. Since 1859, it has been included in Italy. Pop. (1901) 35,447.

PA'VIA: see HORSE-CHESTNUT.

PAVILION, n. *pă-vĭl'yŏn*, or *-ĭ-ŏn* [F. *pavillon;* Sp. *pabellon*, a tent, a flag—from L. *papilĭōnem*, a butterfly, a tent: It. *padiglione*, a pavilion, a canopy: comp. Gael. *paillinn*, a tent]: large handsome tent: in a *building*, a projecting part of the structure, usually more elevated than the rest, under one roof, often of tentlike form, with the slope of the roof either straight or curved. This form is much used in France—the higher parts of the new buildings at the Louvre are good examples. P. roofs are sometimes called French roofs. Pavilions are often domed and turreted. PAVILION, v. to furnish with tents; to shelter with a tent. PAVILIONED, a. *pă-vĭl'yŏnd*, sheltered by a tent.

PAVLOGRAD, *pâv-lŏ-grâd′:* town of s. Russia, in the govt. of Ekaterinoslav, 38 m. e.n.e. of the town of that name, on the Voltcha, affluent of the Dnieper. It was founded 1780 during the reign of Empress Catharine II., and its first colonists were the Zaporogsky Cossacks. But in 1782 a great portion of the English garrison of Fort Magon in Minorca, chiefly Corsicans, having been subdued by the Spaniards, and being forced by the terms of their capitulation to renounce the English service, obtained liberty from Empress Catharine to settle in Pavlograd. Pop. over 14,000.

PAVO, n. *pā′vō* [L. *pāvo* or *pavōnem*, a peacock: OF. and Sp. *pavon:* F. *paon*]: a constellation in the southern hemisphere; a certain fish. PAVONINE, a. *păv′ō-nīn*, resembling the tail of a peacock, or formed of its feathers; applied to ores and other metallic products which exhibit the brilliant hues of the peacock's tail. PAVON′IDÆ, the family of gallinaceous birds known usually as the *Phasianidæ* (q.v.); denoting sometimes a portion of that family separated from the rest on very slight grounds, the chief distinction being the greater expansion of the tail. See PEACOCK: POLYPLECTRON.

PAW, n. *paw* [Bret. *paô;* OF. *poue;* W. *palf*, palm of the hand, a paw]: the foot of an animal having claws; the hand, in contempt: V. to scrape or draw the fore foot along the ground, as a horse. PAW′ING, imp. PAWED, pp. *pawd:* ADJ. having paws.

PAWKY, a., or PAUKY, a. *paw′kĭ* [AS. *pæcan*, to deceive: Low. Ger. *paiken*, to appease by caressing]: *prov. Eng*, and *Scot.*, demurely artful; sly; cunning.

PAWL, n. *pawl* [W. *pawl;* L. *palus*, a pole or stake]: on shipboard, a short bar of wood or iron, or a hook, to prevent the capstan from flying round backward during a pause in the heaving. A similar catch is used in the common windlass.

PAWN, n. *pawn* [Icel. *pantr;* Dut. *pand;* Ger. *pfand;* F. *pan*, a pledge: probably connected with L. *pannus*, cloth—the first pledges being wearing apparel: Pol. *fant*, a piece of cloth, a pawn]: any movable property deposited as security for the repayment of a loan of money; a pledge: V. to pledge or give in pledge; to deposit as a security. PAWN′ING, imp. PAWNED, pp. *pawnd*, pledged; given in security. PAWN′ER, n. *-ẽr*, one who pawns. PAWNEE, n. *pawn-ē′*, one who receives property in pawn. PAWNBRO′KER, one who is licensed to lend or advance money on the security of movable property deposited. PAWNBRO′KING, trade or business of a pawnbroker (see below). PAWN TICKET, a dated receipt given by the pawnbroker for the article received in pledge.

PAWN, n. *pawn* [OF. *paon* and *poon*, a pawn at chess: It. *pedone*, a footman; *pedona*, a pawn at chess: Sp. *peone*, a laborer, a pawn: mid. L. *pedōnem*, a foot-soldier]: a common man at chess.

PAWNBROKING.

PAWN'BROK'ING: business of lending money on pawns or pledges. P. appears to have been carried on in England by certain Italian merchants or bankers as early at least as 1200. By an act of 1284, a messuage in London was confirmed to these traders where Lombard Street now is; the name being, according to Stow, derived from the Longobards who used to congregate there for business purposes. Subsequently, these merchant adventurers became known generally by the name of Lombardens. Their wealth became proverbial. Among the richest of them were the celebrated family of the Medici; from whose armorial bearings it is conjectured that the P. insignia of the three balls have been derived. The bankers of Lombard Street appear to have exercised a monopoly in pawnbroking until the reign of Elizabeth. The trade is recognized in law first by the act 1st James I. c. 21 (1603). In the perilous days of Charles I. the goldsmiths were very frequently chosen as custodians of plate and money; which seems to have suggested to them the profitable business of lending on pawns and discounting bills. From this time the oppression and extortion often exercised by pawnbrokers has occasioned much public discussion; and an effort has been made, in Britain and on the continent, to obviate the evil by the establishment of Monts de Piété for advancing small sums to the very poor at moderate interest: see MONT DE PIÉTÉ. In England, after many abortive efforts, a Mont de Piété office was started 1708; but it came to a disastrous end 1731. The bubble mania of 1824–5 gave rise to a similar scheme, in which more than £400,000 was subscribed; but the undertaking miscarried, and the capital was lost. A similar fate attended the Irish Monts de Piété, of which there were eight in 1841. In 1848 all had disappeared except one, which lingered to 1853, when it also closed. The cause of failure is judged to be generally in the great difficulty of conducting a commercial undertaking on charitable principles, with sufficient energy and ability to compete with others originating in the ordinary motives which lead men to engage in trade.

The greatest P. establishment in the world is the Mont de Piété of Paris. It trades with borrowed capital, and with the profits of former years temporarily capitalized. It has been reported to receive in one year 1,431,575 pledges, valued at about $5,000,000, including renewals, and the average charge was about 15 per cent. per annum. One of the largest offices in England out of London, in one year received 142,835 pledges, valued at £36,560, including renewals, and the average charge was 25 per cent. per annum. Though various circumstances render the difference between the rates really much less than these figures indicate still there is no doubt that the interest on small loans is lower at the Mont de Piété of Paris than in the P. offices in other countries; but this convenience is limited by the fact of the French establishment taking no loans under three francs.

What used to be called in England the 'dolly shop,' and

in Scotland the 'wee pawn' system, was carried on by brokers, ostensibly buying and selling. They received articles as bought; there being a distinct understanding that the seller was to have an opportunity of repurchasing within a limited time, at an understood increase of price. The 'wee' broker was commonly resorted to because the article was below the regular dealer's class of goods. The 'wee pawn' was happily abolished in Scotland years ago.

It hardly admits of dispute that the pawn-shop, in its practical working, is an evil—necessary, it may be, still an evil; and that recourse to it is strongly to be discouraged. There are, doubtless, cases where men are driven to pawn their goods from causes not discreditable, and which do not render it certain that they are on the road to ruin; but such cases are exceptions. Besides making borrowing too easy, and thus encouraging the fatal habit of anticipating income, the pawn-shop is, in nine cases out of ten, the direct or indirect way to the drinking-shop. That 'borrowing dulls the edge of husbandry' applies with a force increasing in geometrical ratio as we descend in the scale of society. Yet so long as improvidence prevails among large classes of society, and so long as even the most prudent are liable to unforseen accidents, the accommodation of the pawn-shop is to some extent a necessity, and like other public demands will continue to be supplied. The Legislature, accordingly, instead of trying to put down P., has wisely confined itself to putting it under stringent regulations preventing as far as possible its abuse.

In Great Britain, by the Pawnbroker's Act, 1872 (which does not affect loans above £10), a pledge is redeemable within 1 yr. 7 days. Pledges pawned for 10s. or less, not redeemed in time, become the property of the pawnbroker; pledges above 10s. are redeemable till sale. The sale must be by public auction. The pawnbroker is allowed to charge as interest ¼d. per month on every 2s. lent when the loan is under 40s., ½d. per month on every 2s. 6d., when the loan is above 40s. In the United States P. is regulated by the law of the several states. In New York the rate of interest in P. fixed by law is 3 per cent. a month (or any fraction thereof) for the first six months, and 2 per cent. a month for each succeeding month on any loan not exceeding $100; and 2 per cent. a month for the first six months and 1 per cent. a month for each succeeding month on any loan exceeding $100. Pledges cannot be sold until after they have been kept one year, and then at public auction by a licensed auctioneer, after publication of at least six days in two daily newspapers designated by the mayor. Pawnbrokers in New York city pay a license fee of $500 to the city, and are under the direct control of the mayor and his marshal. Their books must be kept open to the mayor, criminal courts, police, and police magistrates.

In 1894, during the prolonged depression of business which had begun in 1892, the Rev. Dr. David H. Greer, of St. Bartholomew's (Prot. Episc.) ch., New York, found

that many of the industrious and deserving poor were driven to seek small loans on personal property, especially for the payment of rent, without which they were liable to eviction; while the high rate of interest charged by the pawnbrokers made redemption of articles pawned practically impossible. Hence he was led to form a plan of aiding the deserving poor in a way to combine philanthropy and investment, the motto being "Philanthropy and 5 per cent.," but with readiness to reduce the return even to 1 per cent., should that be necessary. A capital of $160,000 was quickly subscribed. Dr. G.'s plan had as one of its first principles to aid the poor man without compromising his self-respect. Wherever possible, money was to be advanced on chattel-mortgages, allowing the borrowers still to use the furniture or other articles pledged. It was required that the person asking the pledge should be known as trustworthy, to guard against the lending of money on stolen property or for any unworthy purpose. The original office-staff consisted of a bookkeeper, an appraiser, who would as needed visit homes, and decide on the value of the article to be pledged, and a recorder to keep record of loans and chattel-mortgages, and especially to make sure that articles pledged were free from other incumbrance. The sums loaned were to reach if needed $25, $50, or even in special cases $100 on each loan. Dr. G.'s plan was also to bring the system into such connection with the Employment Bureau of his church, as to give applicants all possible aid toward self-support. The plan thus formed resulted in the organization of the Provident Loan Soc., which began operations 1894, May 21, with office at 279 Fourth Ave. To 1895, Dec. 31, the soc. had loaned more than $600,000, of which $200,000 was still outstanding. The soc. had earned more than 6 per cent. on its contributed capital of $100,000 after payment of all charges and expenses, including losses. The rules of the society are: that each loan ticket is good for one year only; loans may be paid by instalments in sums not less than $1; rate of interest 1 per cent. per month or any fraction thereof, this interest not payable by instalments; the loan may be renewed at or before maturity on payment of full amount of interest due. It is at once evident how great must have been the relief afforded by placing this great sum of $600,000 within 19 months in the hands and homes of the poor; while the fact that $400,000 was actually repaid within that time shows how thoroughly deserving were the applicants, and how earnest their desire to repay, when the conditions of the loan were such as to make repayment possible.

PAWNEES, *paw-nēz':* four-fold tribe of Indians now in the Indian Terr. They were known as the Grand, Republican, Tapage, and Loup bands or tribes, and, on the advent of the whites, occupied what is now s. Nebraska and n. Kansas. · On the settlement of these states, they ceded their lands in s. Nebraska, 1833, and retired to n. Nebraska, where further encroachments and the depredation of their old enemies, the Sioux, prompted them 1874 to move into the Indian Terr. They are of the same stock as the Arickarees, Ricarees (or Rees), Caddos, Huecos or Wacos, Tawaconies, Wichitas or Pawnee Picts, and probably the Lipans (*li'panis*=old name *panis* for Pawnees) of Mexico. Their traditions run back to the s.e., probably Louisiana, and fainter tradition to the s.w. and 'stone houses' (like the Pueblos?); within the period of American history, they have lost the art of pottery. They lived in earth-covered lodges, raised some maize and vegetables, and are said to have sacrificed prisoners to the sun to promote good harvests. In 1834, the Rev. Samuel Parker, first Amer. Board missionary to Oregon, failing to connect with the fur-caravan for Green river, left his assistants, Messrs. Dunbar and Allis, as missionaries among the P. After the relinquishment of the mission, Mr. Allis continued as govt. teacher and agriculturist. Later, the Soc. of Friends assumed management and the charge of schools. But the wretched condition of the tribes continued until about 1885. As late as 1876 Maj. North found them clothed only in cotton sheets. Their numbers had been greatly diminished by war, small-pox, and cholera, and still are decreasing under improved conditions. In 1870, they numbered about 3,000; in 1885, 1,045; in 1908, 500. In 1888, 225 could speak English; nearly all wore citizen's clothes wholly or in part; there were 98 houses, some superior to those of white settlers: 2,560 acres were cultivated, and 5,200 fenced; and 1885–88 produce had doubled, reaching $2,500 bush. of wheat and 60,000 of corn. The P. have $30,000 annuity, half in goods, and int. on $250,000 for lands sold. See John B. Dunbar's hist. of P. in *Mag. Amer. Hist.*, 1880, and George Bird Grinnell's interesting *Pawnee Hero Stories and Folk-tales*, 1889.

PAWTUCKET, *paw-tŭk'ĕt:* city in Providence co., R. I., 4 m. n. of Providence; notable centre, since 1790, of cotton and other manufactures. It belonged to Bristol co., Mass., until 1861; was enlarged 1874 by the union with it of a portion of the town of n. Providence; and was incorporated 1886. It lies on both sides of P. river, at the head of its navigation, where the stream has a fall of 30 ft., and thus supplies extensive water-power and is on the N. Y., N. H. & Hartford railroad. The situation is beautiful, and the place has a picturesque appearance. The river above the falls is known as the Blackstone. P. has communications by three lines of railroads, and by water, the river having formerly been a place of shipbuilding and of considerable commerce. Water-works date from 1878, introduced at a cost of $1,330,000, be-

sides the expense of a new pumping station, $150,000. Large imports of coal, lumber, brick, cement, lime, stone, cotton, soda-ash, and laths and shingles, are made, and exports of cotton, scrap-iron, fertilizer, bone, etc. The arrivals of vessels with coal, lumber, etc., during the season of navigation are of daily occurrence and the trade amounts to several millions of dollars annually. The city has a very effective fire dept., national and savings banks, a full system of public schools, a public library, newspapers, and large and active churches representing all the chief Christian denominations. In 1900 there were 534 industrial establishments, employing nearly 13,000 persons in the manufacture of yarn, worsted braid, woolens, cotton cloth, wadding, thread, hair-cloth, cardboard, paper bags, machinery, steam fire-engines, bolts, files, tacks, brooms, chemicals, brushes, screws, boots and shoes, belting, thread spools, furniture, manufacturers' supplies, sash and blinds, and gas; besides the products of cloth and yarn printing establishments, of brass, stove, and iron foundries, of bleacheries, and of tanning and currying establishments. The number of cotton and woolen industries (1900) was 30. The Pawtucket river falls 50 ft. at P., giving abundant water power to the city factories. The industries include cotton, woolen and silk goods, prints, leather, thread, twine, rope, electrical goods, general machinery, nuts and bolts, paper and gymnasium supplies. Calico-printing is done on a large scale, the product being millions of yards annually. The thread mills are among the largest in the world. There are several large bleacheries and dyeing establishments. The first American manufactures of cotton were produced at P. in 1790 by Samuel Slater, who had been an apprentice of Strutt, the partner of Arkwright, in England. He came to New York, 1789, Nov. 18, was brought by Moses Brown to P. 1790, Jan. 18, and after eleven months' work, Dec. 20 started 3 carders and 72 spindles of the Arkwright pattern in an old fulling mill. There are numerous churches, schools, banks, newspapers, and important mercantile establishments at P. The city contains a state armory, two memorial monuments, the Sayles memorial library and other public institutions. Pop. (1900) 39,231; (1910) 51,622.

PAX, n. *păks* [L. *pax*, peace]; called also PACIFICA'LE and OSCULATORIUM [L. *osculor*, I kiss]: in the *Rom. Cath. Church*, the 'Kiss of Peace': also a sacred utensil—sometimes a crucifix, sometimes a reliquary, sometimes a tablet or plate with a figure sculptured or enamelled upon it—employed in some of the solemn services in the ceremony of giving the 'kiss of peace' during the mass. The practice of saluting each other—the men, men, and the women, women—during public worship, particularly in the *agape*, or love-feast, is frequently alluded to by ancient writers, e.g., Cyril of Jerusalem, Catech. xv., and St. Augustine, Serm. 227. All the ancient liturgies, without exception, refer to it as among the rites with which the Eucharist

was celebrated; but they differ as to its time and place in the Eucharistic service. In the Eastern liturgies it is before, in the Western after, the Offertory (q.v.); and in the Roman it immediately precedes the communion. The ceremony commences with the celebrating bishop or priest, who salutes upon the cheek the deacon; and by him the salute is tendered to the other members, and to the first dignitary of the assistant clergy. Originally the laity also were included, but this was long since abandoned. It is when the mass is celebrated by a high dignitary that the utensil called the pax is used. Having been kissed by the celebrant, and by him handed to the deacon, it is carried by the latter to the rest of the clergy. In ordinary cases, the pax is given by merely bowing, and approaching the cheek to the person to whom it is communicated. The pax is omitted in the mass of Maundy (q.v.) Thursday, to express horror of the treacherous kiss of Judas.

PAXO, *pâk'sō:* one of the Ionian Islands, 10 m. s.w. of the coast of Albania, 9 m. s.s.e. of the island of Corfu; about 5 m. long, and about 2 m. broad. The capital, rather the chief village, is Port Gaio (pop. 2,000), on the e. coast. Olives, almonds, and vines are grown, and the island is famous for its oil. Water is sometimes very scarce. Pop. of the island about 3,600.

PAXTON, *păks'ton*, JOHN R., D.D.: Presbyterian clergyman: b. Canonsburg, Penn., 1843, Sep. 18. After entering Jefferson Coll. 1859, he enlisted in the Union army, but subsequently (1866) was graduated. His theol. studies were at the Western Theol. Seminary and at Princeton; he was pastor of the New York Ave. Presb. Chh., Washington, and 1882 was called to the 42d St. Presb. Chh., New York. He was also chaplain of the 7th regt., New York. Ill health caused his resignation of his pastorate, 1893, Nov.

PAXTON, Sir JOSEPH: English architect and horticulturist: 1803–65; b. Milton-Bryant, near Woburn, Bedfordshire. He was sent to Woburn Free School, but left it at an early age, obtained employment as a working gardener, entered the service of the sixth Duke of Devonshire at Chiswick, and was thence transferred to Chatsworth, where he became the duke's chief gardener. His abilities as a horticulturist found ample scope in the beautiful gardens of Chatsworth, and are attested further by *Paxton's Magazine of Botany*, and other works on plants and flowers. His experience in designing capacious glass conservatories at Chatsworth led him to propose a Crystal Palace of glass and iron for the Great Exhibition (q.v.) of 1851, a fairy palace novel, beautiful, and magnificent. His design obtained for him the honor of knighthood. The Crystal Palace of 1851 was removed from Hyde Park, but became the germ of the nobler Crystal Palace at Sydenham, whose construction he superintended. In 1854, P. was returned to parliament in the liberal interest for Coventry, which he represented about ten years.

PAXWAX, n. *păks'wăks* [OE. *fax;* AS. *feax*, hair, and AS. *weaxan*, to grow: corresponding to Ger. *haarwachs*]: in *OE.*, the strong tendon in the neck of animals, probably so named from the long hair growing along the back of the neck: also spelled PACKWAX, which see.

PAY, n. *pā* [OF. *paier;* F. *payer;* It. *pagare*, to pay—from mid. L. *pacārĕ*, to satisfy, to pay—from L. *pacārĕ*, to appease]: wages given for duty or service performed; salary; allowance: V. to discharge a debt; to make amends by suffering; to compensate; to reward; to recompense; in *OE.* and *familiarly*, to beat; to chastise. PAY'ING, imp. PAID pp. pt. *pād*, did pay. PAYER, n. *pā'ĕr*, one who pays. PAY'ABLE, a. *-ă-bl* [F.]. that may be paid; due; that there is power to pay; justly due. PAYEE, n. *pā-ē'*, one to whom money is to be paid. PAYMENT, n. *pā'mĕnt* [F. *payement*]: reward; recompense; something given in discharge of a debt or obligation: in *law* (see below). PAY-BILL, in a *public work* or in the *army*, list of names and wages due to each. PAY-CLERK, one who makes payments, or pays wages. PAY-DAY, day on which wages are paid: on the *London stock exchange*, the last day for closing or settling a stock or share account, generally the 15th and 30th days of the month; in the *New York stock exchange*, settlements are made daily. PAY-OFFICE, apartment in which wages are paid; office for payment of the public debt. PAYMASTER, one who is to pay; officer in the army whose duty is to pay the troops; naval commissioned officer who has charge of all cash payments of the vessel and of the victualling stores —formerly called *purser*. PAYMASTER-GENERAL, in *Britain*, officer of the British ministry, but not of the cabinet, charged with superintending the issue of all moneys voted by parliament. He is virtually the paymaster of the public service, paying merely on the order of the department concerned; is always either a peer or a member of the house of commons, and changes with the ministry.—In the *United States*, duties correspondent to those of the P. G. devolve on the first comptroller of the treasury, assisted by other officials of the treasury department. PAYMASTER-GENERAL, in the *U. S. army*, a brig.gen., chief officer of the pay-department in the office of the sec. of war. PAYMASTER-GENERAL OF THE NAVY, a commodore, chief official in the bureau of provisions and clothing in the U. S. navy department. PAYMASTER-SERGEANT, non-commissioned officer who, as clerk, assists a paymaster. TO PAY FOR, to make amends; to give an equivalent for; to bear the expense of. TO PAY OFF, to pay and to discharge, as a ship's crew; to retort or revenge upon; to requite; among *seamen*, to fall to leeward. TO PAY OUT, to cause to run out, as a rope; to slacken. HALF-PAY, half the ordinary pay of officers allowed to them when not performing military duties, in order to retain a right to their services when required or when they have retired from the service.—SYN. of 'pay, n.': stipend; payment; remuneration; reward; salary; compensation; recompense; hire.

PAY, v. *pā* [OF. *empoicr*, to daub a vessel with pitch —from *poix*, pitch: Ger. *pech*, pitch: Sp. *pega*, a varnish of pitch; *pegar*, to join together, to cement]: to smear with tar, pitch, etc., as a vessel. PAY'ING, imp. PAID, pp. *pād*, perhaps better PAYED, pp. *pād*, to distinguish it from *pay*, to discharge a debt.

PAY'MENT, in Law: discharge of a debt or obligation, especially when money is the means of discharge. Payment must be made in money, unless the creditor waives his right, or another mode of payment is provided for in the instrument creating the obligation: see MONEY. Payment must be made to the creditor or to a person authorized to receive it on his behalf; if an agent is authorized to receive payment in money, and takes payment in goods, his principal is not bound by his receipt. Payment in forged notes or in counterfeit coin is invalid, but the forged notes must be returned in a reasonable time, to throw the loss on the debtor. Usually a bill of exchange or note given to a creditor is not a discharge of the debt till payment of the bill or note. If an agent gives his own note in payment of goods, having received the money from his principal, the payment is good in favor of the principal, unless the note has been received conditionally. If money is sent by letter, the payment is good even if it be lost, if the debtor was expressly authorized or directed by the creditor so to send it. A receipt is only *prima-facie* evidence of payment; it is open to the creditor to show that the particular sum stated in the receipt has not been paid, and also that no payment has been made. Payment must be made at the exact time agreed upon: where no time is specified payment must be made on demand. Payment of part of a debt bars the operation of the statute of limitations.

PAYN, *pān*, JAMES: English novelist: b. Cheltenham, 1830, Feb. 28; d. London, 1898, March 25. He was educated at Eton and Cambridge and was editor of *Chambers' Journal* 1859–71. In 1882 he succeeded Leslie Stephen as editor of the *Cornhill Magazine*, retaining this position till 1896, when failing health obliged him to relinquish it. For many years he wrote exclusively for *Chambers' Journal*, and from 1888 the page of *Weekly Notes* in the *Illustrated London News* was from his pen. The long series of his books begins with *Stories from Boccaccio* in 1852, and closes with *The Backwater of Life*, which appeared in 1899, the 69th work of which he was the author. *Lost Sir Massingberd* (1864) is the best known of his works, and its appearance in *Chambers' Journal* raised the circulation of the periodical 20,000 copies, and permanently established his popularity. Though in no sense an imitator of Dickens, Payn was not a little influenced by the manner of the elder novelist. He possessed a lively, fluent style, an abundant fund of humor, and many popular writers of the present owe to him in his editorial capacity the first

recognition of their talents. He was as much read in this country as in his own, and among the best of his books may be cited in addition to those already named: *Carlyon's Year* (1868); *Gwendoline's Harvest* (1870); *At Her Mercy* (1874); *The Burnt Million* (1890).

PAYNE, Henry B.: American legislator: b. Hamilton, N. Y., 1810, Nov. 30; d. Cleveland, Ohio, 1896, Sep. 9. He was graduated from Hamilton College in 1832, studied law, and in 1834 removed to Cleveland where he was admitted to the bar and established a law practice. In 1846 he entered politics, was State senator in 1849, and in 1860 attended the Charleston Convention where he vainly endeavored to check secession sentiment. Throughout the war he was a strong Union man, and in 1872 was a member of the convention which nominated Horace Greeley for president. He was elected to Congress in 1874, in 1880 and 1884 was a candidate for the Democratic presidential nomination, and in 1885–91 was United States senator.

PAYNE, Henry Clay: American financier and politician: b. Ashfield, Mass., 1843, Nov. 23; d. Washington, D. C., 1904, Oct. 4. He was educated at Shelburne Falls Academy, Mass.; in 1863 went to Milwaukee, Wis., where he entered business as cashier in a dry goods store, and rose from this position to be one of the leading business men and financiers of the State. From 1886 he was president of the Wisconsin Telephone Co., and from 1889 president of the Milwaukee Electric Light and Railway Company; he was president of the American Street Railway Association in 1893–4, and was appointed receiver for the Northern Pacific Railroad in 1893. He was also active in politics and served as the secretary and chairman of the Republican county committee and of the state central committee; he was a member of the Republican national committee from 1880, and vice-chairman of the executive committee. For several years he attempted to have the representation of each State in the Republican national conventions based on the actual Republican vote, and not the representation of the State in Congress. From 1876–86 he was postmaster of Milwaukee, and in 1902 was appointed postmaster-general of the United States.

PAYNE, John, English poet and Oriental scholar: b. London, 1842, Aug. 23. He studied for the bar, and became a solicitor. He was one of a group of English verse-writers, including also O'Shaughnessy and Marziols, that followed the leadership of the pre-Raphaelite poets. Among his original volumes are: *A Masque of Shadows* (1871); *Intaglios* (1871); *Songs of Life and Death* (1872); *Lautree* (1878), *and New Poems* (1880). He also made English renderings of Villon (1878), the *Arabian Nights* (1882–4); *Quatrains of Omar Khayyam* (1898), and *Poems of Shemseddin Mohammed Hafiz of Shiraz* (1901). He was an excellent linguist, and his

style was made interesting by a carefully sustained archaism.

PAYNE, JOHN HOWARD: American actor and dramatist, author of *Home, Sweet Home:* b. 33 Pearl St., New York, 1791, June 9; d. Tunis, Africa, 1852, April 10. The date of his birth is commonly given as 1792, evidently because of an effort on some one's part to exaggerate his remarkable precocity, which was shown at 15, when, having left his boyhood home in Easthampton, Long Island, and having spent several years in Boston, where he was consumed with stage-fever, he became a clerk in a New York counting-house and spent his spare hours editing *The Thespian Mirror*. After two years in Union College in 1809 he made his first appearance on the stage as Young Norval in the Park Theatre, New York. A tour to London 1812–13 followed, and there he wrote several dramas, usually adapted from the French. These are completely forgotten now with the exception of *Clari, or the Maid of Milan,* in which appeared the song *Home, Sweet Home.* Payne knew intimately many English literary persons, and corresponded with Coleridge and Lamb. In 1818 he brought out his very successful tragedy, *Brutus,* in which he would have taken the title rôle but for the objections of his manager Kean, who became famous in the part. He renewed his labors as a critic of the stage, begun in *The Thespian Mirror,* in London during 1826–7 as editor of *The Opera Glass.* He returned to New York in 1832, and in spite of the handsome sums received for *Brutus, Virginius,* and *Charles the Second,* was continually in financial embarrassment. In 1841–5, and from 1851 to his death he was U. S. consul at Tunis. His body was removed thence to Washington, D. C., in 1883. His homeless wandering life adds pathos to his great and well known song. Consult the *Life* by Gabriel Harrison (1875), with an appendix containing Payne's juvenile poems and some of his dramatic criticisms.

PAYNE, JOSEPH: *English educator*: b. Bury Saint Edmunds, 1808; d. 1876. In 1830 he founded a school for boys that later developed into the Denmark Hill Grammar School, and in 1845 he and his wife founded the Mansion House School at Leatherhead. In 1872 he became professor of education at the College of Preceptors. His works include *Lectures on the Science and Art of Education* and *Lectures on the History of Education, with a Visit to German Schools.*

PAYNE, WILL: American journalist and novelist: b. Whiteside County, Ill., 1865, Jan. 9. He went to Chicago from Nebraska in 1890 and began his career on the *Daily News;* in 1896 was financial editor of the *Chronicle* and since 1897 has occupied the same position with the *Economist.* He has published: *Jerry the Dreamer* (1896); *The Money Captain* (1898); *On Fortune's Road* (1902); *Mr. Salt* (1903); *When Love Speaks* (1906); etc.

PAYNE, William Harold: American educator: b. Farmington, N. Y., 1836, May 12. He was educated in the New York Conference Seminary; in 1858-79 he was State superintendent of the public schools of Michigan and in 1879–88 was professor of science and the art of teaching at the University of Michigan. He was president of Peabody Normal College in 1888–1901, when he was recalled to the University of Michigan. He has made translations of various pedagogical works, has published monographs, addresses, etc., on educational matters, and has written: *School Supervision; Education of Teachers* (1901; etc. Among his translations are Compayré's *History of Pedagogy, Lectures on Teaching, Elements of Psychology,* and *Applied Psychology;* and Rousseau's *Emilé.* He has received the degrees of PH.D., LL.D., and LITT.D.

PAYNE, William Morton, LL. D.: American Literary critic: b. Newburyport, Mass., 1858, Feb. 14. He was educated in the public schools, continuing his studies by himself; in 1874–6 was assistant librarian in the Chicago Public Library; since 1876 a teacher in the high schools of Chicago; in 1884–8 literary editor of the Chicago *Morning News,* and of the *Evening Journal* 1888–92. Since 1892 he has been associate editor of *The Dial.* He was lecturer on literature in the University of Wisconsin in 1900 and has become known as a critic of the modern prose and poetry of different countries. He has published: *The New Education* (1884); *Little Leaders* (1895); *Various Views* (1902); *The American Scholar of the Twentieth Century* (1903); *Richard Wagner—A Cycle of Sonnets* (1907); *The Greater English Poets of the Nineteenth Century* (1907); etc. He has edited *American Literary Criticism* (1904); *Select Poems of Swinburne* (1905); *Swinburne's Mary Stuart* (1906); etc. He has also made translations from the Norwegian, notably Björnson's *Sigurd Slembe* and Jaeger's *Henrik Ibsen,* and has written a life of Björnson (1903). He has published numerous articles in periodicals and in Warner's *Library of the World's Best Literature.*

PAYNE-SMITH, Robert: English theologian: b. Chipping Campden, Gloucestershire, 1818, November; d. Canterbury, 1895, April 1. He was educated at Oxford, where he gained the Sanskrit scholarship in 1840 and a Hebrew scholarship in 1843. After taking orders in the English Church he spent a few years in parochial work, and in 1857 was appointed sub-librarian at the Bodleian library. He was regius professor of divinity at Oxford 1865–70, in the year last named, becoming dean of Canterbury. He was a member of the Old Testament Revision committee and belonged to the evangelical party in the Establishment. His greatest work was the *Thesaurus Syriacus* (1868 et seq.), and among his other publications are: *The Authenticity and Messianic Interpretation of the Prophecies of Isaiah Vindicated* (1862); *Prophecy: a Preparation for Christ* (1869).

PAYNIM and **Painim**, n. *pā'nĭm* [OF. *paienisme*, paganism; *paiënie*, heathendom, heathen lands—from mid. L. *paganismus*, paganism—from L. *paganus*, a heathen]: in *OE.*, *literally*, the country inhabited by pagans; a pagan; a heathen.

PAYNIZING, *pān'īz-ĭng* [from *Payne*, the inventor]: process for preserving and hardening wood. It consists in placing well-seasoned timber in an air-tight chamber, and then, when, by means of a powerful air-pump, the wood is deprived of its air, a solution of *sulphuret of calcium* or of sulphuret of barium is admitted, and readily fills the empty vessels all through the wood. The air-pump is again used, and the superfluous moisture drawn out, and a solution of sulphate of iron is injected; this acts chemically on the sulphuret of barium or of calcium, and forms all through the wood either the insoluble sulphate of barium (heavy spar) or of lime (gypsum). The addition of these mineral materials renders the wood very heavy, but it becomes also very durable, and almost incombustible.

PAYSANDU, *pī-sân-dō'*, formerly **San Benito**: chief town of a westerly dept. of Uruguay, on the left bank of the Uruguay river, about 200 m. n.w. of Monte Video It is noted for its export of preserved meat. Pop. 12,000.

PAYSON, *pā'son*, **Edward**, D.D.: Congregational minister, noted for ability and chiefly for eminent piety: 1783, Jan. 25—1827, Oct. 22; b. Rindge, N. H., son of Seth Payson, D.D. At Harvard, where he graduated 1803, he was said to have read the library through. He studied theol. with his father, and sought to know the Bible rather than systems of doctrine. After teaching three years at Portland, Me., he became pastor there, and continued 20 years till his death. With no unusual merits of elocution, his sermons were alive with thought, imagery, and piety, and he was fearless in rebuking evil. His prayers were remarkable. With somewhat extreme introspection and self-mortification, his faith was strong; and, as death approached, rapturous. Among his published addresses were *The Worth of the Bible*, an *Address to Seamen*, and a *Thanksgiving Sermon*. Three vols. of his sermons were issued, 1828, 31, and 33; and subsequently his complete works.

PAYTA, or **Paita**, *pī'tâ:* city, seaport of Peru, on Payta Bay, lat. 5° 5′ s. It has railroad connection with the important city of Piura. The harbor is excellent, and the port is a resort for whaling vessels and for many steamers in the foreign trade. The exports consist of hides, cotton, straw hats and matting, and salt. Until recently all the fresh water used was brought on the backs of mules, but a supply is now obtained by an aqueduct. There are 2 churches and a custom-house. Pop. (1889) 3,500.

PAZ, La, *lâ pâz*, Sp. *lâ pâth* (original name **Nuestra Senora de la Paz**), now popularly **La Paz**: city in Bolivia: see **La Paz**.

PEA, n. *pē* [AS *pisa;* F. *pois*—from L. *pisum;* Gr. *pisos*, a pea; W. *pys*, the pea]: plant, also its seed, of genus *Pisum*, ord. *Leguminōsæ* (see below): plu. PEAS, *pēz*, when number is meant, as six *peas:* PEASE, *pēz, collectively,* as a dish of *pease*—but it is more generally used as an adj., as *pease*-meal. PEA GRIT, a coarse, pisolitic limestone, so called from its being composed of concretionary bodies, which are round, oval, or flattened like crushed peas. PEANUT, the ground-nut (see below). PEA ORE, an ore of iron, occurring in small globular concretions. PEASCOD, n. *pēz'kŏd* [*pea*, and *cod*]: the husk that contains peas. PEA SHELL, the husk of peas. GREEN PEA SOUP, a soup made of green or unripe peas. PEASE MEAL, a flour made from peas. PEASE PUDDING, a pudding made of peas. PEA SOUP, a soup made of peas. SWEET PEA, the *Lathyrus odorātus,* ord. *Leguminōsæ.* PEA MAGGOT, caterpillar of a small moth (*Tortrix* or *Grapholitha pisi*), which lays its eggs in young pods of peas. The caterpillar lives in the pods, and eats the peas. *Note.*—The roots show that *pease* is the proper spelling, and that *s* is part of the original word; *pea* in the singular is a modern corruption, on the supposition that the *se* of *pease* belonged to the plural form —the old plural was *piosan* or *peason.*

PEA (*pisum*): genus of plants of nat. order *Leguminosæ,* sub-order *Papilionaceæ,* closely allied to genus *Lathyrus* (q.v.), from which it differs chiefly in the triangular style. Two species, supposed to be natives of s. Europe and of the East, are extensively cultivated in Europe for their seeds (peas), which are the best of all kinds of pulse; the COMMON PEA or GARDEN PEA (*P. sativum*) in gardens, and the FIELD PEA (*P. arvense*) in fields; both climbing annuals, with pinnate leaves, ovate leaflets, and branching tendrils in place of a terminal leaflet; the Garden Pea distinguished by having two or several flowers on each flower-stalk, the flowers either red or white, usually white, and the seeds subglobular; the Field Pea having one flower on each flower-stalk, the flowers always red, and the seeds angular from crowding and compression in the pod. But it is probable that they are truly one species, of which the Garden Pea has, through cultivation, departed furthest from the original type; and in the United States only one species is recognized in cultivation. Peas have been cultivated in the East from time immemorial, and three out of the four chief ancient Roman writers on husbandry mention this kind of pulse, whose cultivation was apparently introduced into Europe very early; and its cultivation extends from warm climates, as India, even to the Arctic regions, the plant being of rapid growth and short life. The seeds of the Garden Pea are used for culinary purposes both in a green and in a ripe state; also the green succulent pods of some varieties, known as Sugar Peas or Wyker Peas, in which the membrane lining the inside of the pod—parchment-like in most kinds—is much attenuated. Field peas are used both for feeding cattle and for human food. For the latter purpose, peas are often prepared by being *shelled,* or deprived of the membrane which covers them, in a par-

ticular kind of mill; they are then sold as *Split Peas*, and are much in use for *Pea Soup*. They are also ground into meal, which is used in various ways, chiefly for making a kind of pottage and of unleavened bread. In the countries on the Mediterranean, peas are roasted for eating.

In the United States peas find a place in nearly all home gardens, and great quantities are grown in the vicinity of large towns and cities to be sold in a green state in these markets. They are largely grown also for feeding to stock, both in a green and a dry state; and a considerable quantity is exported to England, though this is offset by importations from Canada. There are a great number of varieties, as many as 150 being grown by one New York seed firm. There are three general classes: the smooth, wrinkled, and those with edible pods. But very few of the latter are grown in the United States. The smooth sorts are a little more hardy, but are inferior in quality to the wrinkled kinds. The varieties range in height from 9 in. to 5 ft., and mature at different periods. Among standard sorts are the American Wonder, Little Gem, Bliss's Everbearing, Stratagem, Telephone, and Champion of England—all excellent for the garden; and the Black-eyed Marrowfat for field culture.

The P. succeeds on almost every kind of soil, but makes a much larger growth on rich land than on light soils, though the latter tend to hasten maturity. Green stable-manures largely increase the growth of vine without a corresponding increase of grain. Well-rotted manure is useful, but commercial fertilizers, especially those containing large proportions of potash and phosphoric acid, often prove more satisfactory. Like other leguminous crops the P. uses large quantities of Nitrogen (q.v.), and has the power of obtaining it from the subsoil and probably from the air. For the dwarf sorts the land should be highly fertilized. The land for peas should be well plowed and the fertilizer covered with a harrow. For the home garden the planting should be in double rows, 6 in. apart, and in the case of the tall sorts bushes or wires should be placed between the rows to support the vines. A succession can be obtained by planting varieties which mature at different times or by planting the same sort at intervals of two weeks. If grown for the table none of the seeds should be allowed to ripen, and if grown for seed none should be removed in a green state, the object in the one case being to conserve the strength of the vine, and in the other to secure all the best specimens for seed. Owing to the peculiar structure of the flower varieties are not likely to mix. New sorts are obtained from 'sports' and by cross-fertilization. When grown for market, peas are not bushed. In field culture the P. is sown broadcast at the rate of 2 to 4 bushels of seed per acre, or, what is far better, in drills 3 to 4 ft. apart, according to the size of the variety and the condition of the land, and seeded at the rate of 1½ to 3 bushels per acre. Germination can be hastened by soaking the seed in warm water for a day before sowing. The P. is very hardy, and can be sown as soon as the frost is out of the ground in the

spring. Seed should be covered at least 2 in. deep, in hot weather 3 in., and in field culture the ground should be rolled as soon as the sowing is done. If sown early, peas can be followed the same season by rye or wheat. Weeds should be kept down by frequent use of the cultivator. When the peas are fully ripe they may be cut with a scythe, dried in the sun, and then drawn to the barn and threshed. If well cured the halm or vines will be good fodder for sheep or cows. Instead of cutting the vines are sometimes gathered with a horse-rake. For a soiling crop (see SOILING OF CATTLE) the P. is of great value; also it can be used in many places for the double purpose of affording summer pasture for sheep and renovating the land. For Ensilage (q.v.) also it is valuable. It can be cut from the time the plants are in blossom till the berries are nearly grown. Peas are sometimes sown with oats for green fodder, 2 bushels of peas and 1½ bushels of oats per acre. The plant is very useful as green manure. It thrives on land too poor for clover, yields a large quantity of valuable material, and supplies 2 crops in one season.

The feeding value of peas is due to the large proportion of albuminoids which they contain. The composition of the pea plant varies somewhat with the variety, and with the character of the soil and climate, but the following tables probably represent a fair average.

PERCENTAGE OF DIGESTIBLE NUTRITIVE MATTER.

	Grain.	Hay, cut in blossom.
Water	14·3	16·7
Albuminoids	20·2	8·7
Carbohydrates	54·4	35·6
Fat	1·7	1·8

The inorganic elements (abstracted from the soil) in 100 lbs. of dry material are represented in lbs. and fractions of lbs. as follows :

	Grain.	Stalks.		Grain.	Stalks.
Potash	0·98	1·07	Sulphuric Acid	0·08	0·28
Soda	0·09	0·20	Silica	0·02	0·28
Magnesia	0·19	0·38	Chlorine	0·06	0·30
Lime	0·12	1·86	Sulphur	0·24	0·07
Phosphoric Acid	0·88	0·38			

Peas should be ground before feeding, and if mixed with other grain will give better results than when fed alone. For cows a mixture of 3 parts corn, 2 parts oats, and 2 parts peas ground together makes a rich food and greatly increases the quantity of milk and butter produced. If fed to horses peas should be mixed with equal quantity of corn and ⅛ the quantity of flax-seed. For hogs peas may be mixed with milk, or water, and corn meal. The chief disease of the pea is the mildew. This occurs principally in warm, wet weather, and is most likely to affect late-sown crops. If carefully kept, the seed retains its vitality two or three years, but unless infested with the Pea Weevil (q v.) fresh seed is to be preferred for sowing. The Cow-pea (*Dolichos*) has seeds somewhat resembling beans, but is grown in the same manner as other peas. It is grown largely

at the South, and is a valuable forage crop and soil-improver. The Sweet-pea (*Lathyrus odoratus*), largely grown as an ornamental and flowering plant, also belongs to a different species. It requires early sowing, and if many flowers are desired should not be allowed to produce seed. The so-called everlasting pea is a member of the *Lathyrus* family. It is admired for its fine leaves and flowers.

PEA BEETLE, or PEA CHAFER, *pē chā'fẽr* (*Bruchus pisi*): coleopterous insect, very destructive to crops of peas in s. Europe and in N. America. It is about a quarter of an inch long, black, variegated with bright brown hairs, and with white spots and dots on the wing-cases. It lays its eggs in the young pods, one for each pea, and the larva eats its way into the pea, and completely hollows it out.

PEABODY, *pē'bod-ĭ:* town (formerly South Danvers) in Essex co., Mass.; at the junction of the eastern and southern divisions of the Boston and Maine railroad, 2 m. w. of Salem, 16 m. n.n.e. of Boston. It was named for George Peabody, the London banker and philanthropist, who was born here and who founded here 1852 the Peabody Institute, on which he expended about $200,000. There are numerous churches and schools; 1 weekly and 1 semi-weekly newspaper; 1 national bank (cap. $250,000), and a savings-bank. Among prominent industries are the tanning and curing of leather and manufacture of carriages and glue. Pop. (1900) 11,523; (1910) 15,721.

PEA'BODY, ANDREW PRESTON, D.D., LL.D.: minister, educator: 1811, Mar. 19—1893, Mar. 10; b. Beverly, Mass. He graduated at Harvard 1826. After a course in the Harvard divinity school and one year in math. tutorship, he became pastor of the South Parish (Unitarian), Portsmouth, N. H., 1833. In 1860, he was elected preacher and Plummer prof. of Christian morals, Harvard, and retired as emeritus prof. 1881. He was acting pres. 1862 and 1868–9. For 11 years from 1852, he edited the *N. Amer. Review*, to which and other periodicals he contributed. He always stood high for intellectual ability and Christian nobleness of spirit and as representative of evangelical Unitarianism. His more important works are: *Lectures on Christian Doctrine* (1844); *Sermons of Consolation* (1847); *Conversation, its Faults and Graces* (1856); *Christianity the Religion of Nature* (1864); *Sermons for Children* (1866); *Reminiscences of European Travel* (1868); *Manual of Moral Philosophy* (1874); *Christianity and Science* (1874); *Christian Belief and Life* (1875); *Harvard Reminiscences* (1888); *Harvard Graduates Whom I have Known* (1890). He also edited the life and writings of James Kennard, Jr., the Rev. Jason Whitman, John and William Plummer, and William Plummer, Jr.

PEA'BODY, ELIZABETH PALMER: 1804, May 16—1894, Jan. 3: educator, philanthropist: b. Billerica, Mass.; sister of Mrs. Nathaniel Hawthorne and Mrs. Horace Mann. She studied Greek with Emerson and taught in Bronson Alcott's school. Her chief distinction was that she first introduced into this country the kindergarten system, and

published *The Kindergarten in Italy* (U. S. Bureau of Education 1872) and *Letters to Kindergartners* (1886). Other works by her are *Æsthetic Papers* (1849); *The Polish-Amer. System of Chronology* (1852); *Reminiscences of Dr. Channing* (1880); *Last Evening with Allston, and Other Papers* (1887). She edited *Crimes of the House of Austria* (1852) and Mrs. Mann's *Guide to the Kindergarten* (1877).

PEA'BODY, GEORGE: merchant, banker, and philanthropist: 1795, Feb. 18—1869, Nov. 14; b. Danvers, Mass. His parents were poor, and his only education was at the district school. At the age of 11 he was placed with a grocer, and at 15 in a haberdasher's shop in Newburyport. When 22 years old, he was a partner in Baltimore with Elisha Riggs, who supplied the capital, while P. was the practical manager. As a travelling salesman in N. Y., Penn., Md., and Va., he built up a stupendous business—at the withdrawal of Riggs, about 1830, surpassed by few mercantile concerns in the world. In 1827 he first visited England, where he settled permanently ten years later. Withdrawing from the Baltimore firm 1843, he established himself in London as a merchant and money-broker, and accumulated great wealth. As one of three commissioners appointed 1848 by the state of Md. to obtain the restoration of its credit, he refused all payment, and received a special vote of thanks from the legislature. In 1851 he supplied the sum required to fit up the U. S. dept. at the Great Exhibition. In the following year he sent a large donation, afterward increased to $270,000, to found an Educational Institute, etc., in his native town, Danvers, Mass., now called Peabody. He contributed $10,000 to the first Grinnell Arctic Expedition; $1,400,000 to the city of Baltimore for an Institute of Science, Literature, and the Fine Arts; $8,000,000 for promotion of education, endowment of libraries, etc., in the United States. 1862–68 he gave £350,000 (more than $1,700,000) for improving the condition of the London poor; and in his will he left £150,000 (about $730,000) for the same purpose; in all half a million pounds sterling, which has been applied with careful calculation to construction of improved dwellings, to be rented at low rates to those classes of working-people who have found it difficult to supply their families with suitable homes. Mr. P. died at Eaton Square, London.—See PEABODY EDUCATIONAL FUND.

PEA'BODY, NATHANIEL: revolutionary soldier: 1741, Mar. 1—1823, June 27; b. Topsfield, Mass.; son of Dr. Jacob P. He entered on the practice of medicine at Plaistow, N. H.; was made lieut.col. 1774, but resigned the king's commission; aided in capturing Fort William and Mary; became adjt.gen. of militia 1777. At the beginning of the war he was active in the N. H. legislature and conventions; chairman of the committee of safety 1776; in congress 1779–80; delegate to the New Haven commercial convention 1779; prominent in forming the state constitution 1782–3; mem. of legislature 8 yrs., and speaker 1793; maj.gen. of militia 1793–98. The last years of his life were

passed within the debtor's limits. He died at Exeter, N. H.

PEA'BODY, SELIM HOBART, PH.D., LL.D.: educator and author: b. Vt. 1829; d. St. Louis, 1903. He was prof. of math. and civil engin. in the Polytechnic Coll. of Pennsylvania 1854; principal of the high school at Fond du Lac, Wis., 1859; supt. of schools at Racine, Wis., 1862; teacher in high school, Chicago; prof. of physics and civil engin. in the Agricultural Coll. at Amherst, Mass., 1871; and of mech. engin. and phys. in the Univ. of Ill. 1878; literary ed. of the American Book Exchange 1880, and an associate editor of the *Library of Universal Knowledge*, and then for some years prest. of the Univ. of Ill. Prof. Peabody was president of the Chicago Acad. of Sciences in 1892–95. He has published *Elements of Astron., New Practical Arith., and Cecil's Books of Nat. His.* (3 vols.), treating of beasts, birds and insects, and well adapted to beginners.

PEABODY COLLEGE FOR TEACHERS: founded in Nashville, Tenn., in 1875, by means of the Peabody Educational Fund (q.v.). The need of special training for the work of teaching the young was recognized by Dr. Barnas Sears, president of Brown University, who was trying to place the fund to do the most good for the greatest number. Nashville was selected as the place to found a college for the training of teachers, and the University of Nashville was offered and accepted as a foundation. The school opened with 13 pupils, and in 1907 there were in attendance 945 pupils. The same year (1907) there were 35 professors and instructors; over 20,000 volumes in the library; the buildings and grounds were valued at $202,500. The college receives its support from the Peabody Fund, the State, and the University. Scholarships bestowed by the Peabody Fund are given to a certain number of worthy students of the college. The degree of licentiate of instruction is conferred by the college, and the student holding this degree is by law eligible, without any further examination, for any teaching position in the public schools of Tennessee. The University confers other degrees,—master and bachelor of arts, letters, and sciences. The building is well equipped for laboratory work, professional training, and observation. In 1905 the trustees of the Peabody Educational Fund decided to dissolve the trust and after three years of labor in settling the affairs of the trusteeship, in 1908, October, the principal of the fund was divided, Peabody College being given $1,000,000 and the balance apportioned among 12 of the southern states.

PEABODY EDUCATIONAL FUND: organized trust, for promoting education in the more destitute parts of the south after the civil war of 1860–65; created by gifts of George Peabody (q.v.). The purpose of Mr. Peabody was privately communicated to Robert C. Winthrop, 1866, October, and 1867, February, the communi-

cation to the 16 trustees selected by Mr. Peabody was made, and the trust organized at meetings in Washington, Feb., and in New York, March. In this he gave $1,000,000 'for the promotion and encouragement of intellectual, moral, or industrial education among the young of the more destitute portions of the southern and southwestern states of the Union.' In addition he gave Miss. state bonds of the nominal value of $1,100,000, the state not having at that time repudiated them. In 1869, July 29, he met the trustees at Newport, R. I., and made a second gift of 'securities of the very highest character,' to the amount of $1,000,000, and 6 per cent. Florida bonds amounting to $384,000. The use of the fund he left to the 'absolute discretion' of the 16 trustees.

The trustees held meetings annually, generally in New York city. They filled vacancies caused by the death or resignation and transacted such business as was necessary. The trustees had authority to spend the interest and 40 per cent. of the principal the first two years; after that time the principal was to remain intact for 30 years, when the whole amount might be divided and distributed for educational purposes, as might be deemed best by the trustees. The rules governing the use of the fund were broad, and precautions were taken not to interfere with established schools. Efforts were to be made to work with existing schools, to strengthen weak schools, and to promote in general elementary education. No school should receive aid unless it had in attendance at least 100 students and maintained a school 10 months in the year. The district desiring a share of the fund should contribute twice the amount granted by the trustees. A school having an attendance of 100 pupils and complying with other conditions, might have $300; if 200 pupils were in attendance, it might have $600; and a school of 300 in attendance might have $1,000. Normal and training schools for teachers received special attention. Scholarships were granted to many worthy pupils,—at first $200 each, later $100. From the establishment of the fund to the end of 30 years, the total amount paid out was about $2,600,000. The greater part of this sum was used in Alabama, Arkansas, Florida, Georgia, Louisiana, Mississippi, North Carolina, South Carolina, Texas, Tennessee, Virginia, and West Virginia. In 1905 it was decided by the trustees by a vote of eleven to two to dissolve the trust but as this required a considerable length of time it was not until 1908, October, that it was accomplished. At a meeting held 1908, Oct. 8, in New York city, the trustees distributed the funds as follows: $1,000,000 to the Peabody College for Teachers at Nashville, and the remainder apportioned to 12 of the southern states. An accumulation of $80,000 was also donated to several educational institutions in the south.

PEACE, n, *pēs* [F. *paix;* OF. *pais;* AS. *pais;* Sp. *paz;* It. *pace,* peace—from L. *pax* or *pācem,* peace]: freedom from disturbance or agitation; freedom or respite from war; calm; quiet; rest; concord; harmony; heavenly rest: INT. silence; hist. PEACE'LESS, a. *-lĕs,* void of peace. PEACE'ABLE, a. *-ă-bl,* quiet; disposed to peace; not quarrelsome. PEACE'ABLY, ad. *-ă-blĭ.* PEACE'ABLENESS, n *-bl-nĕs,* state of being peaceable; quietness. PEACE'FUL, a. *-fûl,* quiet; tranquil; mild; removed from noise or tumult. PEACE'FULLY, ad. *-lĭ.* PEACE'FULNESS, n. *-nĕs,* the quality or condition of being peaceful; freedom from disturbance or discord. PEACEBREAKER, one who disturbs the public peace. PEACEMAKER, one who promotes peace by reconciling persons at variance. PEACE OFFERING, among the *anc. Jews,* a voluntary offering to God in thankulfness for His mercies, or as an act of devotion; satisfaction offered for offense given, generally to one in a higher social position. PEACE OFFICER, a civil officer; a constable. PEACE PARTY, a party in favor of maintaining peace with foreign powers as by alleged undue concessions. AT PEACE, in a state of peace; not engaged in war or enmity. TO BE SWORN OF THE PEACE, to be charged on oath for the preservation of the public peace, as a public officer. TO HOLD ONE'S PEACE, to be silent. TO MAKE ONE'S PEACE, to reconcile one's self with or become reconciled with. TO MAKE PEACE, to put an end to war or enmity. JUSTICE OF THE PEACE, see under JUSTICE. COMMISSION OF THE PEACE, a special commission under the great seal appointing justices of the peace.—SYN. of 'peaceable': tranquil; serene; mild; still; pacific; peaceful; undisturbed.

PEACE, ARTICLES OF THE, in Law: complaint made to a court against a person who threatens another with bodily injury; and the redress given is to bind the threatening party over with sureties to keep the peace. Justices of the peace have, by their commission, authority to cause persons to find sufficient security to keep the peace. Hence any one who is threatened either in person or property, or in the person of his wife or child, may go before a justice of the peace and complain on his oath of the fact. The justice is to consider if the language used amounted to a threat, and if he is satisfied that it does, he issues his warrant to bring the party before him, who is then heard in explanation, and if it is not satisfactory, he is ordered to find sureties that he will keep the peace. If he cannot do so, he is committed to prison for a limited time. The truth of the allegations in the A. of the P. cannot be controverted by affidavit or otherwise; but exception may be taken to them as insufficient, or proofs may be offered for reduction of amount of bail.

PEACE, OFFENSES AGAINST THE PUBLIC: offenses which consist in either actually breaking the peace, or constructively doing so by leading directly to a breach. These offenses are now usually known under the heads of unlawful assemblies, seditious libels and slanders, riots,

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affrays, challenges to fight, forcible entry and detainer, and libel and slander. Those who take part in an unlawful assembly commit a misdemeanor against the public safety. All persons assembled to sow sedition, and bring into contempt the constitution, are in an unlawful assembly. It is somewhat difficult to define precisely what amounts to an illegal assembly, except by saying that it points to some course inconsistent with the orderly administration of the laws. It is the duty of all individual citizens to resist and oppose any unlawful assembly; but the duty rests primarily with the magistrates of the district, who are indictable for breach of duty in not taking active and immediate steps to put down riots. The magistrates ought to call at once upon special constables to be sworn in, and if these are insufficient, to call for the aid of the military. Seditious libels also are offenses against the peace, as inciting directly to a breach: such are libels vilifying the legislative or the executive government, or the courts of justice; and in Great Britain libels against even a foreign sovereign, because the tendency of such a libel is to breed misunderstanding between national governments. A riot is the most active form of an offense against the public peace. To constitute a riot, there must be at least three persons engaged together in pursuance of an illegal purpose. Riots often originate in an attempt to redress summarily some private wrong. On such an occasion, before extreme measures are resorted to, and as a test of the good faith of those who are spectators, instead of parties, and by way of full notice to all concerned, the magistrate or officer of the peace commands all persons to disperse, otherwise they will be guilty of felony. Persons not retiring may be arrested, and carried before a justice, and committed to prison. It is, however, possible that the justices may make a mistake in thinking that to be an illegal assembly which is not so; accordingly if the party arrested prove at the trial that it was no illegal assembly, he will be discharged. An affray also is an offense against the public peace, being a public assault, i.e. an assault committed in presence of third parties, for this is apt to lead to further breaches of the peace by others joining in it. Thus prize-fights and duels are affrays, and all present at them are principal offenders. So challenges to fight, provocations to fight, and forcibly entering into a house, are misdemeanors against the public peace.

PEACE RIVER: large stream of Canada, rising in British Columbia, about lat. 55° n., flowing n. and n.e. about 1,000 m. through the territory of Athabasca to Lake Athabasca, whence its waters are carried by the Slave river and the Mackenzie to the Arctic Ocean. Much of its course is navigable. Its valley is very rich and fertile.

PEACH, n. *pēch* [F. *pêche;* OF. *pesche*—from It. *pesca* or *persica,* a peach—from L. *persĭcum,* the Persian fruit, a peach—from *Persĭcus,* of or from Persia]: a very fine fruit—also the tree—the *Amygdălus Persĭca* or *Persĭca vulgāris,* ord. *Rosācĕæ* (see below): in *mining,* name given

by Cornish miners to certain rocks of a bluish-green color —a lode composed of it is called *peachy lode.* PEACHY, a. *pēch'ĭ*, resembling the peach. PEACH-COLORED, a. in color like a peach-blossom; of a delicate pale red.

PEACH, v. *pēch* [a slang corruption of *impeach*]: to inform against; to betray one's accomplice. PEACH'ING, imp. PEACHED, pp. *pēcht.*

PEACH (*Amygdalus Persica*): fruit-tree much cultivated in temperate climates; native of Persia and n. India. It is of the same genus with the Almond (q.v.)—from which Darwin believed it to have been derived—having oblongo-lanceolate serrulate leaves; solitary pink flowers, appearing before the leaves; and the sarcocarp of the drupe succulent.—The NECTARINE differs from the P. only in having a smooth fruit, while that of the P. is downy or velvety; and it is a mere variety, probably produced and certainly preserved by cultivation. Its fruit is scarcely equal to that of the P., and its smooth skin, which gives it a handsome appearance, exposes it to the attacks of the curculio. In general the methods of pruning and cultivation are alike for both fruits. Both peaches and nectarines are divided into *freestones* and *clingstones.* In the Freestone P. the flesh of the fruit parts from the stone; in the Clingstone it adheres to it. The Freestone P. is the *Pêche* of the French, the Clingstone P. their *Pavie.* Of all these there are many sub-varieties, the finer ones being perpetuated by budding. There is a remarkable variety of Chinese origin, with the fruit compressed and flattened, and with almost evergreen leaves.

The P. is propagated from the seed and by budding (see NURSERY). By the latter method varieties are perpetuated, but by the former they are not usually reproduced. Grafting, successful often in warm climates, is likely to fail in cold regions. Stocks may be budded the first year of their growth from seed, and transplanted the next year but one. The P. thrives in most mild climates, and to some extent is grown as far n. as New England, but is liable to be destroyed by severe cold. In England it is grown in houses or trained on walls. The trees are rather small, rarely reaching a height more than 25 ft., and the majority not growing near as tall. In the n. United States the P. is a rather short-lived tree, but under favorable conditions it lives 50 to 100 years. The season of its profitable bearing in orchard cultivation at the North ranges from 5 to 10 years. The P. thrives best in warm and rather light soils, but can be grown on clays and other lands. If wet, the soil must be thoroughly drained. The trees should be in straight rows, and be placed 12 to 20 ft. apart each way for standards, and 8 to 10 ft. for dwarfs. Stable manure promotes the growth of the trees but injures the quality of the fruit. Either wood ashes or complete commercial fertilizers give excellent results. The ground is to be kept free from grass and weeds, and the surface made mellow by frequent cultivation. Beans or potatoes may be grown between the trees for two or three years after the orchard

is planted, but fertilizers must be liberally applied, and after the third year the trees should have all the ground. The trees should be pruned every spring. The heads need to be kept low, and the branches of the previous year's growth shortened one-third to one-half. Any shoots showing signs of weakness or disease should be wholly removed. The fruit is always produced on wood formed the year before; consequently, a reasonable number of annual shoots should be left on all parts of the tree, but they must not be allowed to reach too great a length. For home use the fruit is allowed to ripen on the tree, as it there reaches its highest degree of perfection; but for market, especially if to be shipped long distances, it must be picked before it is fully ripe. The quality of the fruit is greatly modified by climate—a fact which should always be kept in mind when planting. Some varieties which are very fine at the north are worthless at the south, and the southern varieties lose their fine qualities when taken to the colder portions of the country. The best American sorts also fail in England, even under careful culture in protected situations. The greater portion of the peaches grown in the United States are produced in N. J., Del., Md., Penn., Va., and Cal., where some of the P. orchards contain thousands of trees. In Cal. the fruit reaches great size. Large quantities are grown also in some of the s. and w. states, and there are orchards of some extent in N. Y., Conn., and Mass.; but in the latter states the trees are rather short-lived. In rich soil the tree makes rapid growth, and on some of the western plains it is sometimes used for fuel. The fruit is not only used in its fresh state, but vast quantities also are canned, and many thousands of bushels are evaporated and sold as dry peaches. In the extensive P. growing regions considerable quantities of P. brandy are made from the ripened fruit. There is a poisonous acid in the leaves and bark of the tree, and in the kernel of the fruit. In small gardens the P. is sometimes grown as a dwarf. The dwarfs, formed by working the P. on the plum, also are planted with considerable success on cold and on clay soils. The chief enemy of the P. is the peach-worm, or borer (*Ægeria exitiosa*), which works into the bark below the surface of the land. Every tree should be examined in spring and summer, and the borers cut out. Piling a mixture of lime and ashes around the trunks of the trees has a tendency to keep these pests away. Closely covering the trunk, from the ground to a height of 6 or 8 inches, with pasteboard or oiled paper will also prevent attacks of these insects. The most formidable disease of the P. is the Yellows. It is extremely virulent and contagious. A knife used in pruning an affected tree is said to communicate the disease to a healthy one, and seeds from the fruit of a diseased tree are likely to produce stocks which fall an easy prey to the malady. The disease often spreads without direct contact with an affected specimen. Various theories have been held regarding the cause of the disease, and numerous remedies proposed; but the most thorough and careful investigators

are undecided as to the cause, and no effectual treatment has been found. On the first appearance of the disease, indicated by premature ripening of the fruit, a yellow color of the leaves, and a feeble growth and appearance, the tree should be cut and burned; and no other P. tree should occupy the land for several years. In N. Y. and a few other states there is a law that all peach trees affected by the yellows shall be destroyed, and officers are appointed to enforce its provisions. The U. S. govt. has obtained a quantity of seed from Turkestan in hope of securing a hardy stock that will not be affected by the yellows. The *leaf-curl* sometimes proves quite injurious to the tree. It was formerly charged to attacks of insects, but is now believed to be caused by sudden changes of weather. The affected leaves should be picked when the weather becomes settled. The preventives are sheltered locations and such cultivation as will promote vigorous growth.

PEACH'-WOOD, or LIMA-WOOD, *lē'mâ-wûd:* a dye-wood imported from S. America, said to be derived from a species of Cæsalpinia, allied to that which yields the Nicaragua wood. It yields a fine peach color, whence its name; and is used in muslin and calico printing and dyeing.

PEACOCK, n. *pē'kŏk* [F. *paon;* L. *pāvo;* Dut. *pauuw*, a peacock—from the cry of the bird; Gr. *taōs*, a peacock: comp. Pers. *táwus;* Tamil, *tókei*, a peacock]: large domestic bird, remarkable for the beauty of its plumage (see below): fem. PEA'HEN: ADJ. applied to ore and minerals which exhibit an iridescent lustre like the changing hues of the peacock's tail; pavonine. PEA'CHICK, n. *-chĭk*, the chicken or young of the peacock. PEACOCK FISH, a fish of the Indian seas, having beautiful streaks of color.

PEA'COCK, or PEA'FOWL (*Pavo*): genus of gallinaceous birds of family *Pavonidæ*, or *Phasianidæ*, of which only two species are known, natives of the E. Indies; birds of large size, and remarkable for magnificence of plumage. The bill is of moderate size, somewhat arched toward the tip; the cheeks nearly naked; the head crested, the tarsi rather long, and armed with a single spur; the wings short; the upper tail-coverts prolonged far beyond the tail, and forming a splendid train—popularly called the *tail*—which is capable of being erected and spread out into a great disk, the true tail being at the same time erected to support it. The Common P. (*P. cristatus*) has for crest a kind of aigrette of 24 upright feathers, with slender almost naked shafts and broad tip. The tail consists of 18 brown stiff feathers, and is about six inches long. The train derives much of its beauty from the loose barbs of its feathers, while their great number and unequal length contribute to its gorgeousness, the upper feathers being successively shorter, so that when it is erected into a disk, the eye-like or moon-like spot at the tip of each feather is displayed. The lowest and longest feathers of the train do not terminate in such spots, but in spreading barbs, which encircle the erected disk. The blue of the neck;

the green and black of the back and wings; the brown, green, violet, and gold of the tail; the arrangement of the colors, their metallic splendor, and the play of color in changing lights, render the male P. an object of universal admiration—a sentiment in which the bird himself evidently participates to a degree that is very amusing, as he struts about to display himself to advantage, and labors to attract attention, affording a familiar proverbial image of ostentation and pride. When the disk is erected, the P. has the power of rattling the shafts of its feathers against each other in a very peculiar manner, by a strong muscular vibration. The Peahen is much smaller

Peacock.

than the male bird, has no train, and is of dull plumage, mostly brownish, except that the neck is green. As in some other gallinaceous birds, the female has been known, in old age, to assume the plumage of the male. Individuals with white plumage are frequent, in which even the eye-like spots of the tail are but faintly indicated; and pied peacocks, having the deep blue of the neck and breast contrasted with pure white, are sometimes seen. The P. is generally supposed to have been known to the Hebrews in the time of Solomon, but it is not certain that the word commonly translated *peacocks* in the account of Solomon's importations from Tarshish (II. Chron. ix. 21) does not signify *parrots*. It is usually stated that it became known to the Greeks first on the occasion of Alexander's expedition to India, but Aristophanes mentions it in plays written before Alexander was born. The P. became common among the Greeks and Romans; a sumptuous banquet in the latter days of Roman greatness was scarcely complete without its flesh; and wealth and folly went to the excess of providing dishes of peacocks' tongues and peacocks' brains. Throughout the middle ages, also, a P. was often presented at the tables of the great, on great occasions, the skin with the plumage being placed around the bird after it was cooked. The P. is now common in most parts of the world; generally kept, however, except in warm countries, for ornament rather than for profit, though both

the flesh and the eggs are very good food. It readily partakes of all the ordinary food provided for the poultry-yard, and is fond of buds and succulent vegetables. It is hardy enough even in cold climates, except that few eggs are laid, and the young are difficult to rear, but the adult birds sit on trees or on the tops of houses, stacks, etc., during the keenest frosty nights, never, if they can avoid it, submitting to the confinement of a roosting-place, like that of the common fowl. Peacocks are found in almost all parts of India, Siam, etc.; and the multitudes in some districts are wonderful. 'About the passes in the Jungle-tery district,' Col. Williamson says, in *Oriental Field Sports*, 'whole woods were covered with their beautiful plumage, to which a rising sun imparted additional brilliancy. The small patches of plain, among the long grass, most of them cultivated, and with mustard then in bloom, which induced the birds to feed, increased the beauty of the scene; and I speak within bounds when I assert that there could not be less than 1,200 or 1,500 peafowls, of various sizes, within sight of the spot where I stood for near an hour.' Sir James Emerson Tennent, also, in his work on Ceylon, says that 'in some of the unfrequented portions of the eastern province, to which Europeans rarely resort, and where the peafowl are unmolested by the natives, their number is so extraordinary that, regarded as game, it ceases to be "sport" to destroy them; and their cries at early morning are so tumultuous and incessant as to banish sleep, and amount to an actual inconvenience.'—The harsh cry of the P. seems to have been imitated in its Greek name *Taōs*, and probably has given rise also to the Latin *Pavo* and the English *pea*-cock. The P., in a wild state, always roosts on trees, but makes its nest on the ground. When alarmed, as it feeds on the ground, it cannot readily take wing, and is sometimes run down by dogs or by horsemen.—The other species of P. is the JAPAN P. or JAVANESE P. (*P. Japonensis*, *Javanicus*, or *muticus*), native of some s.e. parts of Asia and neighboring islands; nearly equal in size to the Common P., but of less brilliant though very similar plumage. The cheeks and around the eyes are yellow; the neck, and other fore parts, greenish with golden reflections. The crest is longer than that of the Common P., its feathers less equal, and webbed along their length.

PEA'COCK-STONE: name under which the dry cartilaginous ligaments of some large lamellibranchiate mollusks, e.g., the pearl oyster, are sold by jewellers. They are used for ornamental purposes, though not so much as formerly; and mostly on the continent of Europe, particularly Portugal. They have opaline reflections, and are therefore sometimes called *Black Opal*.

PEA CRAB (*Pinnotheres*): genus of brachyourous crustaceans, with nearly circular and not very hard carapace. They are of the size of a small pea, and interesting from their living within the mantle-lobes of lamellibranchiate mollusks, a fact well known to the ancients, and giving rise to curious fables. A species (*P. veterum*) is

very common in the *pinnæ* of the Mediterranean, and was imagined to render important services to its host in return for its lodging, keeping a lookout for approaching dangers, against which the blind pinna itself could not guard, and particularly apprising it, that it might close its shell when the cuttle-fish came near. It is remarkable that this is repeated by Hasselquist in the middle of the 18th c. as a piece of genuine natural history. Whether the P. C. lives at the expense of the mollusk and sucks its juices, is uncertain: it is certain that the flesh of such mollusks is palatable to pea crabs, and they eat it greedily in the aquarium. Species are found in almost all parts of the world.

PEA-JACKET, n. *pē'-jăk-ĕt* [Dut. *pije*, a coarse thick cloth: Goth. *paida*, a coat: Fin. *paita*, a shirt: comp. Gael. *peitean*, a woolen shirt: W. *pais*, a coat]: a coarse woolen jacket worn by seamen; a pilot's rough heavy coat.

PEAK, n. *pēk* [Ir. *peac*, a sharp-pointed thing: Gael. *beic*, a point: Sp. *pico;* F. *pic*, a sharp point: AS. *peac;* It. *picco*, a peak]: the top ridge or jutting part of a hill or mountain; the rising front part of a thing, terminating somewhat like a point; the upper outer corner of an extended sail; a point: V. to raise more obliquely. PEAK'ING, imp. PEAKED, pp. *pēkt:* ADJ. pointed; ending in a point. PEAKY, a. *pēk'ĭ*, having peaks, or situated on them. PEAK'ISH, a. *-ĭsh*, having peaks; hilly; exposed.

PEAK, v. *pēk* [Gael. *piochan*, one who wheezes as from sickness: It. *pigolare*, to whine or pule: Sw. *pjaka*, to whine or pule]: in *OE.*, to waste away in sickness; to become emaciated; pule; whine. PEAK'ING, imp.: ADJ. puling; sickly; showing signs of decay. PEAKED, pp. *pēkt.* PEAK'ISH, a. having pale, sharp features.

PEAL, n. *pēl* [perhaps a shortened form of Eng. *appeal:* F. *appel*, a call with a drum or trumpet; *appeau*, a bird-call; *appeaux*, the chimes or chiming of bells: comp. Norw. *bylia*, to resound, to bellow: Icel. *bylr*, a tempest, *bialla*, a bell]: a succession of loud sounds, as of thunder; a set of bells tuned to produce musical combinations or chimes when rung; chimes rung upon a set of bells. V. to resound; to utter or give forth loud or solemn sounds. PEAL'ING, imp.: ADJ. uttering loud successive sounds; sounding as a peal. PEALED, pp. *pēld.*

PEALE, *pēl*, CHARLES WILSON: artist, mechanician, and museum collector: 1741, Apr. 16—1827, Feb. 22, b. Chesterton, Penn. After working at saddlery, he studied portrait-painting in Boston under Copley, and at London under Benjamin West; painted in Annapolis, Md., 1774, and Philadelphia 1776; was capt. of volunteers in the war of 1812, having part in the battles of Trenton and Germantown; member of the legislature 1779; collected materials for the museum named after him and opened 1802; lectured on nat. hist.; and was active in founding the art acad. of Philadelphia. At one time and another he practiced modelling, engraving, dentistry, taxidermy, and the making of coaches, clocks, and watches. He painted many eminent men, and 14 portraits of Washington between 1772–83;

also *Christ Healing the Sick;* and published a treatise, *Building Wooden Bridges* (1797); a discourse on nat. hist. (1800); *The Means of Preserving Health* (1803); and *Domestic Happiness* (1816). He died at Philadelphia.

PEALE, Rembrandt: artist: son of Charles W. P.: 1778, Feb. 22—1860, Oct. 3; b. Bucks co., Penn. At 18 years of age, after painting a portrait of Gen. Washington, he was in southern cities, excepting two years abroad; 1807-09, in Paris, painting eminent Frenchmen for his father's museum; 1810 in northern cities in the United States; again abroad for some years. He was pres. of the Amer. Acad., and one of the founders of the National Acad. of Design. From Houdon's bust and his own knowledge, he painted 1823 a portrait of Washington esteemed the best by Chief-Justice Marshall. He died in Philadelphia. Of his other works, the best known are *The Roman Daughter* and *The Court of Death* (1820); also, *Napoleon on Horseback* (1810); *Jupiter and Io; Lysippa on the Rock;* and *The Ascent of Elijah.* He published an account of the *Skeleton of the Mammoth* (1802); *Notes on Italy* (1831); *Graphics* (1841); *Reminiscences of Art and Artists* (1845).

Pean.

PEAN, n. *pē'ăn:* see Pæan. Pe'anism, n. *-izm*, the song or shouts of triumph; ascription of tuneful praise to a victor.

PEAN. *pēn* [Old Fr. *pannes*]: in heraldry, one of the furs, differing from Ermine only in the tinctures: the ground being sable, and the spots of gold.

PEA'NUT (*Arachis hypogæa*): annual leguminous plant, probably native of S. America; known also as *goober*, *ground-nut*, *pindar*, and by various other names (see Arachis). It is extensively cultivated for its seeds, which are used for food and for the manufacture of oil. The plants grow from 10 to 20 in. in height, and after the petals fall the flower-stalks penetrate the earth and the fruit is formed under ground. For its full development the P. needs a warm climate. It is largely grown in portions of Africa, India, S. America, the W. Indies, and the United States. In the latter country the production as a market crop is nearly confined to the states of Va., N. C., and Tenn. It can be grown on a variety of soils, but as dark or red soils stain the pods and lower the market price, sandy lands or light clays are preferred. The land should be well plowed and harrowed, and fertilized by application of lime or superphosphate. The heaviest seed is to be used for planting; and, as breaking the pink membrane in which it is enveloped will prevent its germination, it must be shelled carefully. Ordinary planting machines cannot be used, but one for the special purpose has been invented. Rows are to be 2½ or 3 ft. apart, and hills about the same distance. Two bushels of seed in pods, or 5 pecks shelled, will stock an acre. Planting is done in May or early in June. Weeds

must be kept out by cultivation. Harvesting is done in October. The plants are loosened by a plow, then taken out with a fork or by hand. After lying in the sun a day or two, they are put in small stacks with the roots out, where they should dry for a few weeks. The nuts are then picked from the vines by hand. The imperfect ones are thrown out, and the good ones are cleaned by shaking in a crate with spaces to allow the dirt to fall through. Some wholesale dealers have machines for this purpose. The nuts weigh about 22 lbs. per bushel, and are put in bags holding 100 lbs. The average yield per acre is not much above 25 bushels, though more than 100 bushels have been obtained. After the harvesting is done, swine are turned into the fields to gather and fatten on the nuts left in the ground. The vines are useful for fodder. The seeds yield about 20 per cent. of a fixed oil of yellow color and bland flavor, with a specific gravity of ·918. It is an excellent lubricant, burns well in warm weather, is used in dressing woolen cloth and in manufacture of soap, and is said to be largely sold as olive oil. In 1890 the peanut product of the U. S. was 3,588,143 bushels, the greatest supply being from Va., where 58,951 acres produced 1,171,624 bushels. New York consumes 500,000 bushels of the nuts each year.

PEA ORE: form of compact brown iron ore (hydrated peroxide of iron), consisting of round smooth grains from the size of mustard-seed to that of small peas. Sometimes the grains are still smaller and flattish. This iron ore is abundant in some places in France, and is smelted.

PEAR, n. *pär* [AS. *pera;* F. *poire;* It. *pera;* L. *pirum*, a pear]: a fruit—also the tree—*Pyrus commūnis*, sub-ord. *Pomĕæ*, ord. *Rosācĕæ* (see below). PRICKLY PEAR (see that title). PEAR-SHAPED, a. ovate beneath and conical, like a pear. THE PEAR IS RIPE, the matter has come to maturity

PEAR (*Pyrus communis*): tree of the same genus with the Apple (see PYRUS), and like it one of the most extensively cultivated and valuable fruit-trees of temperate climates. The leaves are ovate, serrated, smooth on both surfaces, and without glands; the flowers are produced in corymbs, which may almost be called umbels, and are smaller than those of the apple; the styles are distinct and not combined at the base, as in the apple; and the fruit is hemispherical at one end, tapering gradually away, more or less rapidly, to a point at the other. The tree grows wild in central and s. portions of Europe and in large portions of Asia. In this condition it is only a small tree —often nothing more than a shrub; but under cultivation it sometimes reaches a height of 60 ft., and the trunk a diameter of 1 to 2½ ft. Though somewhat difficult to start, it becomes, when well established, very vigorous, and lives to a great age. The Stuyvesant P. tree, planted 1648 at the point now the corner of 13th st. and 3d ave., New York, was yielding fruit at the age of 200 years, and there are several trees in Europe known to be about 400 years old. The P. was introduced probably

by the Romans into Britain, and cultivated in early times by various nations; but no great improvement in the quality of the fruit seems to have been made till the 17th c. Now there are more than 1,000 varieties, many of which have a delicate flavor widely different from the coarse quality of the original stock. The tree is grown almost entirely for its fruit, though the wood, of reddish color and very hard and fine-grained, is in demand for various purposes, and is sometimes stained to imitate ebony.

The P. thrives throughout the United States except in limited areas, and on nearly all soils that are naturally or artificially drained, but thrives especially on heavy loams and clays. The ground should be kept fertile by application of lime and ashes, or commercial fertilizer. An exhausted soil is a frequent cause of a poor quality of fruit. The P. is propagated from seeds, buds, and root-grafts, the last two methods reproducing the specific variety (see BUDDING: GRAFTING). It is grown as a standard or as a dwarf, the former being budded or grafted on a pear stock; and the latter being worked usually on the quince. Standard trees should be set 20 to 25 ft. apart, and dwarfs 10 to 12 ft.; but in planting a large number of trees it is well to put a row of dwarfs between each two rows of standards and a dwarf between every two standards in the row. The standards require about 10 years to come into bearing, but the dwarfs will yield good crops in 5 years. The dwarfs will interfere but little with the growth of the standards, and by the time the latter have come into full bearing the dwarfs will begin to decline, and can be removed. Some varieties thrive better as dwarfs than as standards; with a large number of sorts there is no apparent difference, but a few cannot be profitably grown on the quince. A proper selection of varieties will enable the grower to have fruit from midsummer till the next spring. Large and beautiful specimens are often obtained from young trees, but, as a rule, fruit of the finest flavor is borne by trees that have reached maturity. More than with most other fruits the quality of the P. is influenced by soil and climate. Some sorts, very fine in good land and with good care, prove of little value when planted in a poor soil and neglected. Some of the European varieties of good quality in their native countries do not thrive in the United States, though others prove fully as good here as in their earlier home.

Cultivation of the land increases growth of the tree, but is thought by some to render it more susceptible to attacks of the blight. When grown in grass a circle of several ft. around the trunk should be heavily mulched. By this means grass and weeds will be kept down, and the roots of the tree will be kept at a more uniform temperature than would otherwise be possible. Pruning should receive careful attention, the objects being to keep the tree in proper form and to remove all sickly or feeble shoots. In some varieties there is a strong tendency to overbearing, and a prompt thinning of the fruit becomes essential to the health of the tree, and greatly improves the quality of the

product. Excepting a very few sorts pears should be gathered 10 days to 2 weeks before they are ripe. They should be placed in shallow trays and kept in a dark room in which the temperature ranges from 60° to 70°. By means of the cold-storage method the ripening process may be delayed for months (see FRUIT—*Keeping of Fruit*). Winter pears can safely remain on the tree till the leaves fall or till sharp frosts occur. The P. is attacked by various insect enemies. These can be destroyed by the prompt and, if necessary, repeated use of a kerosene emulsion (made by thoroughly mixing 2 parts of kerosene with 1 part of soft soap and diluting with 20 to 40 parts of water) sprayed over the trees. The principal diseases of the P. are the fire-blight and the leaf-blight. The fire-blight is a fungoid disease, attacks weak and imperfectly nourished trees, causes a blackened appearance of the leaves and branches, and, if not promptly checked, destroys the tree. All diseased portions of an affected tree should be cut away and burned as soon as the first indication of disease appears. The leaf-blight works great injury to seedlings in the nursery, and often attacks larger trees, causing their leaves to fall about midsummer, checking growth of the tree and involving loss of the fruit. Spraying the trees with the Bordeaux mixture (made from solutions of sulphate of copper and fresh lime) of strength varying with the age and vigor of the tree, seems the most promising remedy. Preventive measures consist in maintaining a vigorous condition of the tree.

In England the juice of the P. is expressed in the same way as cider from apples, and under the name of Perry is largely used as a beverage. It contains 5 to 9 per cent. of alcohol. The best quality is made from the coarser-flavored varieties of the fruit, and large orchards are grown specially for its production. The pear is used not only fresh, but is also preserved.

The following table shows the percentages of the ash constituents of the various portions of the P., and furnishes an indication of the rapidity with which these elements of fertility are abstracted from the soil in which it is grown.

	Potash.	Soda.	Lime.	Phosphoric Acid.	Sulphuric Acid.
Wood	23·5	—	67·0	6·2	3·4
Leaves	26·6	—	46·5	8·1	3·9
Fruit	54·7	8·5	8·0	15·3	5·7

Many fine varieties of the P. have been obtained from hybridization, by selection, and from accidental seedlings. The Le Conte and the Kieffer are selected seedlings from the almost worthless Sand P., imported from China. The Seckel originated near Philadelphia, and was disseminated from a single tree. The Bartlett, which supplies at least three-fourths of the pears grown for market in the United States, originated in England; but the stock in this country can be traced to 2 trees owned by Enoch Bartlett, of Dorchester, Mass., from whom it received its American name. The *Jargonelle* and many of the varieties known as *Bergamot* and *Beurré* are highly esteemed. We are indebted to France and Belgium for many fine varieties.

Besides the varieties of pear usually referred to *Pyrus communis*, some are occasionally cultivated which are generally regarded as distinct species. Such are the AURELIAN PEAR (*P. salvifolia*), native of France, with leaves much narrower than the common pear, and a long fruit, which is used for making perry; the SNOWY PEAR (*P. nivalis*), native of the Alps of Austria, with oval obtuse leaves white and silky beneath, and a globose fruit, which is very acid till it becomes quite ripe or is beginning to decay, when it is very sweet, the SAND PEAR (*P. sinensis*), native of China and Cochin-China, with heart-shaped, shining, almost evergreen leaves, and apple-shaped warted fruit, very gritty, and fit only for baking, cultivated in gardens in India. The PASHIA (*P. pashia* or *P. variolosa*), a native of the Himalaya, yields fruit edible only when bletted or partially decayed. The PALTOO (*P. lanata*) is another Himalayan species with edible fruit.

PEARL, n. *pĕrl* [F. *perle;* It. *perla;* OHG. *perala;* Port. *perola*, a pearl: mid. L. *perŭla*—probably dim. of *pirium*, a pear: comp. Ger. *beere*, a berry]: a hard, smooth, small body, of a white iridescent color and round shape, found in species of oyster, and in other bivalves, highly valued for its beauty (see below): *figuratively*, something very precious: anything round or bright, e.g., a drop of rain: a small printing-type: V. to set or adorn with pearls; to resemble pearls. PEARL'ING, imp. PEARLED, pp. *pĕrld:* ADJ. adorned or set with pearls; resembling pearls. PEARLACEOUS, a. *pĕrl-ā'shŭs*, resembling mother-of-pearl. PEARL'Y, a. *-lĭ*, clear, pure, and iridescent, like a pearl; containing pearls. PEARL'INESS, n. *-nĕs*, state of being pearly. PEARLASH, an impure carbonate of potassa obtained from the ashes of wood (see POTASH). PEARL BARLEY, finely prepared barley-grains (see BARLEY). PEARL DIVER, one of the men whose employment is to dive in the Indian seas for oysters that contain pearls. PEARL EDGE, projections at the side of ribbons; a narrow kind of thread-edging to be sown to lace. PEARL-EYED, a. having a white speck on the eye. PEARL GRASS or WORT, the common name for certain British wild plants of the ord. *Caryophyllaceæ*. PEARL-OYSTER, a bivalve from which pearls are obtained (see below). PEARL SAGO, a sago in the form of small, hard grains. PEARL SINTER, a volcanic mineral occurring in smooth, shining, globular masses. PEARL SPAR or STONE, a variety of feldspathic lava containing globules from the size of a grain of sand to that of a hazel-nut, having a glassy and pearly lustre; a variety of dolomite having a pearly lustre. PEARL STITCH, an ornamental stitch in knitting stockings. PEARL-STUDDED, a. studded with pearls. PEARL WHITE, a preparation of bismuth (see WHITE COLORS). PEARL-SHELL, or MOTHER-OF-PEARL, the inside surface or lining of pearl-oysters and other shells (see MOTHER-OF-PEARL).

PEARL: peculiar product of certain marine and fresh-water mollusks or shell-fish. Most of the molluscous animals which are aquatic and inhabit shells are provided with a fluid secretion, with which they line their shells.

giving to the otherwise harsh granular material, of which the shell is formed, a beautifully smooth surface, which prevents any unpleasant friction upon the extremely tender body of the animal. This secretion is evidently laid in extremely thin semi-transparent films, which, in consequence of such an arrangement, have generally a beautiful iridescence, and form in some species a sufficient thickness to be cut into useful and ornamental articles. The material itself in its hardened condition is called *nacre* by zoologists, and by dealers Mother-of-pearl (q.v.). Besides the pearly lining of the shells, detached and generally spherical or rounded portions of the nacre are often found on opening the shells, and there is reason to suppose these are the result of accidental causes, such as the intrusion of a minute grain of sand or other substance, which, by irritating the tender body of the animal, obliges it in self-defense to cover the cause of offense which it has no power to remove; and as the secretion goes on regularly to supply the growth and wear of the shell, the included body constantly gets its share, and thereby continues to increase in size until it becomes a pearl. The Chinese avail themselves of the knowledge of this fact to compel one species of fresh-water mussel, *Unio Hyria*, to produce pearls. In order to do this, they keep the Unios in tanks, and insert between the shell and the mantle of the animal either small leaden shot or little spherical pieces of mother-of-pearl. These are sure to receive regular coatings of the nacreous secretion; and after a time look like pearls formed under natural conditions. These ingenious people practice another trick on these animals: they insert small images of the Buddha stamped out of metal, which soon become coated with the pearl-secretion, and are cemented by it to the shells; to those ignorant of its origin, the phenomenon is a supernatural testimony to the truth of Buddhism. Examples of these curiosities are in many museums in western lands.

A plan of making pearls was suggested to the Swedish govt. by Linnæus. It consisted in boring a small hole through the shell of the river mussel, and inserting a grain of sand, so as to afford a nucleus for a pearl. The plan at first succeeded so far as to indicate its practicability, and he was rewarded by a sum of money, about $2,200, but it failed to be commercially profitable, and was abandoned.

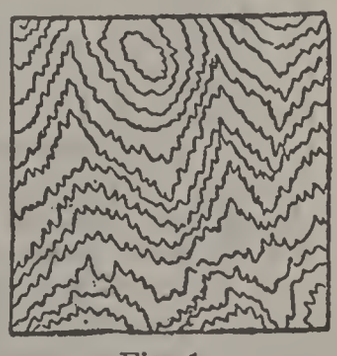


Fig. 1.

The exact nature of the secretion has not been determined; it is, however, ascertained that it is deposited in thin films, which overlie each other so irregularly, that their sharply serrated edges, when magnified, present the appearance represented in fig. 1; and to this peculiar disposition of the plates, the beautiful iridescence of common pearls is attributed. Their formation was a great puzzle to the ancients, among whom

they were very highly prized. Dioscorides and Pliny mention the belief that they were drops of dew or rain which fell into the shells when opened by the animal, and were then by some power of the animal altered into pearls. This opinion, which obtained all over the east is thus charmingly alluded to by Moore:

> 'And precious the tear as that rain from the sky,
> Which turns into pearls as it falls in the sea.'

The most famous pearls are from the east; the coast of Ceylon, or Taprobane as it was called by the Greeks, having from earliest times been the chief locality for P. fishing. They are, however, obtained now of nearly the same quality in other parts of the world, e.g., Panama in Central America, St. Margarita in the W. Indies, the Coromandel Coast, the shores of the Sooloo Islands, the Bahrein Islands, and the islands of Karak and Corgo in the Persian Gulf. The pearls of the Bahrein fishery are said to be even finer than those of Ceylon, and they form an important part of the trade of Bassora. These, and indeed all the foreign pearls used in jewelry, are produced by the Pearl Oyster (q.v.). The shells of the mollusks which

Fig. 2.

yield the Ceylon, Indian, and Persian ones, are sometimes 12 inches in diameter, and usually about nine inches. Those of the new world, though the shells are smaller and thicker, are believed to be the same species. The chief locality of the Ceylon pearl fishery is a bank about 20 m. long, 10 or 12 m. from shore, opposite to the villages of Condatchy and Arippo on the n. coast. The season of the fishery lasts about three months, commencing at the beginning of Feb., and the fishery is under govt. regulations. The boats employed are open, and of 10 to 15 tons burden; they put out at night, usually at 10 o'clock, on a signal gun being fired from the fort of Arippo, and make for the govt. guard vessel, which is moored on the bank, and serves the double purpose of a guard and a lightship. The divers are under the direction of a manager, called the Adapanaar, and they are chiefly Tamils and Moors from India. For each diver there is provided a diving-stone, weighing about thirty lbs. which is fastened to the end of a rope long enough to reach the bottom, and having a loop made for the man's foot; and in addition to

this, a large net-work basket, in which to place the pearl oysters as he collects them. This apparatus is hung over the sides of the boat; and the diver, placing his foot in the loop attached to the stone, liberates the coils of the rope, and with his net-basket rapidly descends to the bottom. To each boat there is usually allotted a crew of 13 men and 10 divers, 5 of whom are descending while the others are resting. This work is done very rapidly; for, notwithstanding the stories to the contrary, the best divers cannot remain longer than 80 seconds below, and few are able to exceed 60. The greatest depth to which they descend is 13 fathoms, and the usual depth about 9 fathoms. When the diver gives the signal by pulling the rope, he is quickly hauled up with his net and its contents. Accidents rarely happen; and as the men are very superstitious, their safety is attributed to the incantations of their shark charmers, performed at the commencement of the fishing. Sir E. Tennent, however, attributes the rarity of accidents from sharks, usually so abundant in tropical seas, to the bustle and to the excitement of the waters during the fishery frightening them away. The divers are sometimes paid fixed wages, others agree for one-fourth of the product. When a boat-load of oysters has been obtained, it returns to shore, and the cargo, amounting sometimes to 20,000 or 30,000, is landed and piled on the shore to die and putrefy, in order that the pearls may be easily found. The heaps are formed in small compartments, each with walls one or two ft. high. Several of these compartments surround a small central inclosure, in which is a bath, and they slope toward this bath, and are each connected with it by a small channel, so that any pearls washed out from the putrefying mass by the rain may be carried into the bath. When the animals in the shells are sufficiently decomposed, the washing commences, and great care is taken to watch for the loose pearls, which are always by far the most valuable; the shells are then examined, and if any attached pearls are seen they are handed over to the clippers, who, with pincers or hammer, skilfully remove them. Such pearls are used only for setting; while the loose ones, usually quite round, are drilled and strung, and can be used for beads, etc. The workmen employed to drill the pearls also round the irregular ones, and polish them with great skill. The method of holding the pearls during these operations is ingenious; they make a number of holes of small depth in a piece of dry wood, and into these they fit the pearls, so that they are only partly below the surface of the wood, which they then place in water. As it soaks up the water and swells, the pearls become tightly fixed, and are then perforated, etc. These operations are all carried on on the spot.

For many miles along the Condatchy shore, the accumulation of shells is enormous, averaging at least four ft. in thickness. This is not wonderful, when it is remembered that this fishery has been in active operation for at least 2,000 years. The place itself is exceedingly barren and dreary, and, except during the fishing season, is almost

deserted; but at that time, thousands of people, of various countries and castes, are here drawn together. The Ceylon fishery fluctuates much from year to year. In 1874, it was worth only about $35,000 to the government; in 1881, about $300,000 (17,000,000 shells being landed in 40 days).

The pearls vary much in size; those as large as a pea and of good color and form are the best, except unusually large specimens, which are rare, the most extraordinary one known being that owned by the late Mr. Hope, which was two inches in length and four in circumference, and weighed 1,800 grains. The smaller ones are sorted into sizes, the very smallest being called seed-pearls. A considerable quantity of these last are sent to China, where they are said to be calcined, and used in Chinese pharmacy. Among the Romans, the P. was a great favorite, and enormous prices were paid for fine ones. One author gives the value of a string of pearls at 1,000,000 sesterces, or almost $40,000. The single pearl which Cleopatra is said to have dissolved and swallowed was valued at nearly $400,000; and one of the same value was cut into two pieces for ear-rings for the statue of Venus in the Pantheon at Rome. In later times, we read of a pearl, in Queen Elizabeth's reign, belonging to Sir Thomas Gresham, valued at about $75,000, and which he is said to have treated after the fashion of Cleopatra; for he powdered it and drank it in a glass of wine to the health of the queen, in order to astonish the ambassador of Spain, with whom he had laid a wager that he would give a more costly dinner than could the Spaniard.

During the occupation of Britain by the Romans that country became famous for its pearls found in the fresh-water mussel of the rivers. see FRESHWATER MUSSEL. Generally the pearls of this mollusk are small, badly colored, and often valueless; but occasionally they occur of such beauty as to rival those of the pearl-oyster. Several years ago, in the Scotch rivers, the search for pearls was prosecuted vigorously, especially by a merchant named Unger, of Edinburgh, who had brought Scotch pearls into great repute. He collected specimens ranging in value, as was stated, from about $25 to $450 each, and formed a necklace said to be worth about $1,500. In Scotch pearls of the highest quality there is a pleasing pinkish tint, which is very permanent. The fishing for pearl-mussels is much less dangerous and troublesome than for pearl-oysters: they are found usually in the beds of streams, shallow enough to wade in, and so clear that the pearls can be seen at the bottom. If too deep to remove with the hand, they are easily captured by putting a stick between their gaping shells, which instantly close upon it and can be drawn out with it.

Very fine river pearls, known on the European continent as Bohemian pearls, are found in the rivers Moldau and Wottawa. There is also a fresh-water P. fishery in Bavaria, where the river Iltz yields at times very fine specimens. Even the most inferior pearls have a market

value; for pearls can be properly polished and rounded only with pearl-dust, which is made by powdering the inferior pearls.

False Pearls are admirable imitations, made by blowing very thin beads or bulbs of glass, and pouring into them a mixture of liquid ammonia, and the white matter from the scales of the Bleak (q.v.), and sometimes of the Roach and Dace. The proper way to prepare the pearl-matter is first to remove the scales of the lower part of the fish; these must then be very carefully washed, after which they are put to soak in water, when the pearly film falls off and forms at the bottom of the vessel a sediment which is removed and placed in liquid ammonia for future use. This P. mixture, when of the best quality, is very costly—as much as $20 or $25 per ounce. For use, it is diluted with ammonia, and injected into the glass beads, so as to thinly coat them inside; afterward the better kinds have melted white wax poured in, which renders them much more durable. The French and Germans produce in this way imitations of the finest oriental pearls, of such beauty that the most practiced eye can scarcely detect the difference. The invention of artificial pearls is due to a Frenchman, named Jaquin, in the time of Catharine de' Medici; and the manufacture is now carried on chiefly in the dept. of the Seine, where great improvements have lately been made, especially in the art of giving the irregular forms of large pearls to the glass-bulbs, and thus increasing the resemblance, and in removing the glassy appearance caused by the exterior glass coating, by exposing it for a short period to the action of the vapor of hydrofluoric acid. Mucilage of fine gum-arabic also is used instead of wax; which increases the translucency, gives greater weight, and is not liable to melt with the heat of the wearer's body—a defect to which those filled with wax are very liable.

Roman Pearls differ from other artificial pearls, by having the coating of pearly matter on the outside, to which it is attached by an adhesive substance. The art of making these was derived from the Chinese.

PEARL RIVER: stream in Miss., rising about 100 m. n.n.e. of Jackson, and flowing s. through the state, separating Miss. from La. in its lower course and emptying into Mississippi Sound, near the outlet of Lake Pontchartrain. It flows nearly 300 m. through a fertile cotton country, and is navigable to Jackson, the capital.

PEARL-OYSTER (*Avicula* or *Meleagrina margaritifera*): lamellibranchiate mollusk, of family *Aviculidæ*, usually found—great numbers together—attached to submarine rocks at considerable depth on the coasts of tropical countries; and important as producing almost all the pearls and all the mother-of-pearl of commerce. It is called sometimes the PEARL-MUSSEL; but the family to which it belongs differs considerably both from that of mussels and from that of oysters; the valves of its shell being unequal, the hinge-line straight and long, and the animal furnished

with two adductor muscles, one of them small, and with a foot by which it produces a byssus. The pearl oyster is of oblique oval form, longitudinally ribbed, and with concentric foliations when young which disappear when it is old. It attains a large size; and there are several varieties, for the most important, see MOTHER-OF-PEARL. The whole inside of the shell is covered with a thick layer of nacre or mother-of-pearl, compact and beautiful, forming indeed the chief part of the shell, and exhibiting considerable variety of color, most frequently white, sometimes blood-red. Pearls are formed of the same substance (see PEARL), and are generally produced by eggs which have become abortive, and which remain lodged within the mollusk instead of being ejected into the sea.—The pearl oyster is too rank and coarse to be eaten. When taken from the sea it is commonly laid out in the sun to die, that the pearls may be sought for after the shell opens.—The pearl oyster is not the only mollusk which produces pearls. The *Placuna placenta*—an oyster (family *Ostreadæ*) with thin transparent shell used in China and elsewhere as a substitute for window-glass—produces diminutive pearls. The Freshwater Mussel (q.v.) produces pearls sometimes of considerable beauty and value; and pearls have been found in the common oyster, in pinnæ, etc., and even in limpets.

PEARMAIN, n. *pär'mān* [F. *parmain*]: a variety of the apple.

PEARSON, *pēr'son*, CHARLES HENRY: English historian: b. Islington, 1830, Sep. 7; d. London, 1894, May 29. He was educated at King's College, London, and Exeter College, Oxford, was elected fellow of Oriel, in 1855 was made lecturer in English literature at King's, and shortly thereafter professor of modern history. In 1862–3 he edited the *National Review*, in 1865 withdrew from his chair at King's, and in 1869–71 was lecturer on modern history at Trinity College, Cambridge. After an experience (1871–4) as a sheep-farmer in South Australia, he was appointed by the minister of education to prepare a report on the condition of education in Victoria (1877), and presented a document of much value, recommending many changes since introduced. In 1878 and 1880 he was elected to the legislative assembly for Castlemaine, and in 1883–92 sat for the East Bourke boroughs. From 1886 to 1890 he was minister of education, in which capacity he worked effectively toward reorganization and reform, and in 1893 was made permanent secretary to the agent general. His chief publication is *National Life and Character* (1893; 2d ed. 1894), a work prophesying the decay of European civilization through the disappearance of independent character and genius, due to the increase of democracy in the highly civilized nations of the West; and the growing importance of Chinese and negroes in world-politics and trade. Others of his works are: *The History of England dur-*

ing the Early and Middle Ages (1867); *Historic Maps of England during the First Thirteen Centuries* (1870); and *English History in the 14th Century* (1873). Consult the biography by Stebbing (1900).

PEARSON, Charles William: American Unitarian clergyman: b. Selby, Yorkshire, England, 1846, Aug. 7; d. Quincy, Ill., 1905, July 13. He was employed by a firm of ship-owners in whose service he went to Calcutta and South America, teaching for a time in a mission school in Buenos Ayres. He came to the United States and in 1866 entered the Northwestern University, Watertown, Wis., where he was graduated in 1871. He was tutor in German and history there in 1871–6 and occupied the chair of English literature in 1881–1902. In 1876–7 he was pastor of Methodist Episcopal churches in Bangor and Breedsville, Mich., and from 1902–5 occupied the pulpit of the Unitarian Church, Quincy, Ill. He published: *Methodism, a Retrospect and an Outlook* (1891); *The Carpenter Prophet* (1902); etc.

PEARSON, Cyril Arthur: English publisher: b. Wookey, near Wells, England, 1866, Feb. 24. He was educated at Winchester College and joined the staff of Sir George Newnes and became manager of the latter's publications. He founded *Pearson's Weekly* which met with success and subsequently started *Home Notes, Pearson's Magazine, Short Stories, Royal Magazine, Lady's Magazine, M. A. P.*, and in 1900 his most important publication, the *Daily Express*, a halfpenny London paper. He has since established newspapers in various cities in Great Britain and is the principal owner of the *St. James Gazette*.

PEARSON, John, D.D.: English prelate of high celebrity: 1612, Feb. 28—1686, July 16; b. at Great Snorring, in Norfolk, of which place his father was rector. He was educated at Eton and King's College, Cambridge, where he took the degree M.A. 1639, and in the same year took orders, and was collated to a prebend in Salisbury Cathedral. In 1640, he was appointed chaplain to Finch, lord-keeper of the great seal; and on the otubreak of the civil war became chaplain to Lord Goring, and afterward to Sir Robert Cook, in London. In 1650, he was appointed minister of St. Clement's, Eastcheap, London; and 1659 published the great work by which he is now remembered, *An Exposition of the Creed*. It was dedicated to his flock, to whom the substance of it had been preached some years before in a series of discourses. The laborious learning and the judicial calmness evinced by the author in this treatise have long been acknowledged, and command the respect even of those who think his elaborate argumentation tedious and not always forcible. It is generally reckoned one of the ablest works produced in the greatest age of English theology—the 17th c. During the same year, Pearson published *The Golden Remains of the Ever*

Memorable Mr. John Hales of Eton. At the Restoration, honors and emoluments were lavishly showered upon him. Before the close of 1660 he received the rectory of St. Christopher's, in London; was created D.D. at Cambridge; installed prebendary of Ely and archdeacon of Surrey; and made master of Jesus College, Cambridge. In 1661 he obtained the Margaret professorship of divinity, and was one of the most prominent commissioners in the famous Savoy conference; 1662 he was made master of Trinity, Cambridge, and 1673 was promoted to the bishopric of Chester. In 1672 he had published *Vindiciæ Epistolarum S. Ignatii,* in answer to Daillé, who had denied the genuineness of the epistles. It was imagined for years that Pearson had triumphed over his opponent. The history of the controversy, however (see IGNATIUS), has since been deemed to show that Daillé was right and Pearson wrong. In 1684 appeared his *Annales Cyprianici.* Pearson's *Opera Posthuma Chronologica* were published by Dodwell (Lond. 1688), and his *Orationes, Conciones et Determinationes Theologicæ* contain much valuable matter.

PEARSON, JOHN LOUHBOROUGH: English architect: b. Brussels, Belgium, 1817, July 15; d. London, 1897, Dec. 11. He was trained in his profession by Ignatius Bonomi of Durham and by Salvin and Hardwick in London; early displayed much skill in mediæval design; was employed in several important restorations; and in St. Peter's, Vauxhall, produced his first (1861) distinctive work. He continued to devote himself to the development of Gothic, giving his attention to no special phase—though he favored early pointed. His name is largely associated with certain London churches designed by him. The following are conspicuous: Holy Trinity, Bessborough Gardens; St. John, Red Lion Square; and St. Augustine's, Kilburn. But he is perhaps equally well known for his cathedral restorations. He became architect to Lincoln cathedral in 1870, to Bristol cathedral in 1880; was also architect to Rochester, Chichester, and Wakefield cathedrals; was consulting architect to those of Exeter and Gloucester; and restored the upper part of the north transept front and the south aisles of choir and nave in Westminster Abbey. In 1879 he received 'the greatest ecclesiastical opportunity which has been offered to any modern architect' in his appointment as architect for the new cathedral of Truro, which has been described as the only Gothic work of modern times worthy of the name cathedral. The building was consecrated 1887, Nov. 3, and the completed part opened for service. Pearson's labors were not wholly ecclesiastical, as he also designed country-seats, mansions, and other structures. But these works, though excellent in their kinds, added little to his reputation. He was the real founder of the school of modern Gothic, which aims not to copy mediæval precedent but to design anew

in the mediæal spirit, but wrote nothing relative to his art.

PEARSON, KARL, M.A., LL.B., F.R.S.: English mathematician: b. England 1857. He was educated at King's College, Cambridge, and in Germany, admitted to the bar in 1882, and in that year was appointed professor of geometry at University College, London. In 1885 he was promoted to the chair of applied mathematics and mechanics, which he has since occupied. He has published: *The New Werther* (1880); *The Ethic of Freethought* (1888); *The Chances of Death, and Other Studies in Evolution* (1897); *Enlarged Grammar of Science* (1899); *History of the Theory of Elasticity and Strength of Materials* with Todhunter (1886–93); etc.

PEARY, ROBERT EDWIN: aretic explorer: b. Cresson, Pa., 1856, May 6. At an early age he removed with his parents to Maine; graduated at Bowdoin College, afterward at the U. S. Military Academy. In 1885 he was appointed civil engineer in the U. S. navy, with rank of lieutenant. In 1886 he made a journey to Greenland. In 1891, June, he sailed from New York in the *Kite*, and made his headquarters on the w. coast of Greenland, at McCormick Bay, 77° 45′ n. lat., 71° w. long., from which point he made extensive sledge-excursions reaching 82° n. lat., and proving Greenland to be an island, as he saw the channel that forms its n. boundary at its w. outlet, and followed it until he saw it join the Arctic ocean on the e. He returned in the summer of 1892, and devoted himself to an extended lecturing tour in the United States.

In 1893 two expeditions under Lieut. Peary's command sailed for Greenland, the main expedition leaving St. John's, N. B., in July, and the Peary Auxiliary Expedition sailing from New York, June 30 to rendezvous at Bowdoin Bay, Inglefield Gulf, 77° 43′ n. lat., 35 m. n. of McCormick Harbor. On September 12 a daughter was born to Mr. and Mrs. Peary at Falcon Harbor. In 1894, March 6, Peary started on an overland journey, but was driven back by violent and continued storms. Much scientific information was gained by the two expeditions, whose members returned to St. John's 1894, Sept. 15, with the exception of Lieut. Peary, Hugh J. Lee, and a colored servant, who remained at the north to resume exploration the following year.

In 1895, April 1, Peary started with a companion and servant and a supporting party of natives. He reached Independence Bay, but at the cost of great suffering and peril, the unprecedentedly heavy snows of the preceding winter having buried his caches of food beyond recovery, and obliterated the marks. The natives deserted, only one of the dogs survived, and for the last two weeks of the return-trip the three men lived on one meal a day, reaching Bowdoin Bay July

25. August 4 the relief expedition arrived with the *Kite*, on which all returned, reaching St. John's September 21. Among important scientific results was the finding of a meteorite weighing forty tons.

In 1896 Peary led a sixth expedition in the steamer *Hope*, leaving Sydney, Cape Breton, July 15, and returning September 26. In 1897 he conducted an expedition to Greenland, returning to Sydney September 20. In 1898–1892 he made his most important expedition in search of the North Pole, under the direction of the Peary Arctic Club of New York city. In 1898, August, his ship, the *Windward*, had reached the northern side of Princess Marie Bay, where her progress was stopped by the ice. In December he left the ship, and by sledge reached Fort Conger. He returned to the fort again in 1899, April, explored the region of Lady Franklin Bay, and rescued the instruments and records left by Greeley at the Fort in 1883. From June to July he explored the Princess Marie Bay region, crossed the Ellsmere ice cap, and established a line of caches from Cape Sabine to Fort Conger. In 1900 he again visited Fort Conger, and from there sledging over the ice along the northwest coast, reached Cape Washington, lat. 83° 39′, but finding further progress barred by an impassable sheet of water, turned and explored the east coast to within a degree of Independence Bay. In 1902, March, he made another start from Payer harbor, and traveling over the frozen Polar Sea, reached Crozier Island, but after that finding every day's march more difficult, and encountering open leads and floes, he had to abandon his hope of reaching the Pole. He had gone as far as latitude 84° 19′, the most northerly point that had then been reached by any American explorer. In August he sailed on his return voyage in the new *Windward*, which had been sent north by the club for him. Careful surveys were made at all stages, and much useful information gained; he determined conclusively the northern limit of Greenland, proved the non-existence of land for a considerable distance to the northward and northeastward, and determined the origin of the floe bergs and palæocrystic ice. In 1905 he again started on a voyage in the *Roosevelt* to locate the north pole and succeeded in reaching 87° 6′ thus creating another record. He returned in 1906 and in the summer of 1908 began another voyage in the *Roosevelt*. He has written *Northward over the Great Ice* (1898), an account of his earlier voyages. See POLAR EXPEDITIONS; ARCTIC OCEAN. Commander Peary has received numerous medals in recognition of his scientific work, among them being the Cullum medal and the Daly Gold medal of the American Geographic Society, the Kane gold medal of the Philadelphia Geographic Society, the Patron's medal of the Royal Geographic Society of London, and the medal of the Royal Scottish Geographic Society of Edinburgh.

PEARYLAND: northeastern coast of Greenland, between Independence Bay and the 80th degree of latitude; named in honor of Robert E. Peary.

PEASANT, n. *pĕz'ănt* [F. *paysan;* OF. *paisant,* a peasant—from mid. L. *pagen'sis,* a countryman: F. *pays;* It. *paese,* country—from L. *pagus,* a village or canton]: one occupied in rural labor; a countryman; a rustic; a hind; a swain: ADJ. of or relating to peasants; rural. PEAS'ANTRY, n. *-rĭ,* the body of country people; the rustics taken together. *Note.*—It will be seen from the root-words that *peasant* and *pagan* have the same origin, the primary meaning of each being 'the inhabitant of a village': see PAGAN.

PEAS'ANT WAR: in German history the great insurrection of the peasantry which broke out in the beginning of 1525, and which Zschokke has described as the 'terrible scream of oppressed humanity.' The oppression of the peasants had gradually increased in severity, as the nobility became more extravagant and the clergy more sensual and degenerate. The example of Switzerland encouraged the hope of success, and 1476-1517 there were risings here and there among the peasants of s. Germany. A peasant rebellion, called, from its cognizance, the *Bundschuh* (Laced Shoe), took place in the Rhine countries 1502; and another, the 'League of Poor Conrad,' in Würtemberg 1514; both of which were put down without any abatement of the grievances which occasioned them. The Reformation, by the mental awakening which it produced, and the diffusion of sentiments favorable to freedom, must be reckoned among the causes of the great insurrection itself; though Luther, Melanchthon, and the other leading reformers, while urging the nobles to justice and humanity, strongly reprobated the violent proceedings of the peasants. The Anabaptists, however, in particular Münzer, encouraged and excited them; and a peasant insurrection took place in the Hegau 1522. Another, the 'Latin War,' arose 1523 in Salzburg, against an unpopular archbishop, but these were quickly suppressed. 1525, Jan. 1, the peasantry of the abbacy of Kempten, with the towns-people, suddenly assailed and plundered the convent, compelling the abbot to sign a renunciation of his rights. This proved the signal for a rising of the peasants on all sides throughout s. Germany. Many of the princes and nobles at first regarded the insurrection with some complacency, because it was directed in the first instance chiefly against the ecclesiastical lords; some, too, because it seemed likely to promote the interests of the exiled Duke of Würtemberg, who was then on the point of reconquering his dominion by the help of Swiss troops; and others, because it seemed to set bounds to the increase of Austrian power. But Archduke Ferdinand hastened to raise an army, the troops of the empire being mostly engaged in

the emperor's wars in Italy, and intrusted the command of it to the Truchsess von Waldburg, a man of stern and unscrupulous character, but of ability and energy. Von Waldburg negotiated with the peasants to gain time, and defeated and destroyed some large bodies of them, but was himself defeated by them 1525, Apr. 22, when he made a treaty with them, but with not the slightest intention of keeping it. Meanwhile the insurrection extended, and became general throughout Germany, and a number of towns took part in it, e.g., Heilbronn, Mühlhausen, Fulda, Frankfurt, etc.; but there was total lack of organization and co-operation. Toward Easter, 1525, there appeared in Upper Swabia a manifesto, which set forth the grievances and demands of the insurgents. They demanded the free election of their parish clergy; appropriation of the tithes of grain, after competent maintenance of the parish clergy, to support of the poor and to purposes of general utility; abolition of serfdom, and of the exclusive hunting and fishing rights of the nobles; restoration to the community of forests, fields, and meadows, which the secular and ecclesiastical lords had appropriated to themselves; release from arbitrary augmentation and multiplication of services, duties, and rents; equal administration of justice; and abolition of some of the most odious exactions of the clergy. The conduct of the insurgents was not, however, in accordance with the moderation of their demands. Their many separate bands destroyed convents and castles, murdered, pillaged, and were guilty of the greatest excesses, which must indeed be regarded as partly in revenge for the cruelty practiced against them by Von Waldburg. A number of princes and knights concluded treaties with the peasants conceding their principal demands. The city of Würzburg joined them, but the Castle of Liebfrauenberg made an obstinate resistance, which gave time to Von Waldburg and their other enemies to collect and strengthen their forces. In May and June, the peasants sustained a number of severe defeats, in which large bodies of them were destroyed. The Landgraf Philip of Hesse also was successful against them in n. Germany. The peasants, after they had been subjugated, were everywhere treated with terrible cruelty. In one instance a great body of them were perfidiously massacred after they had laid down their arms. Multitudes were hanged in the streets, and many were put to death with the greatest tortures. Weinsberg, Rothenburg, Würzburg, and other towns which had joined them, suffered the terrible revenge of the victors, and torrents of blood were shed. It is supposed that more than 150,000 persons lost their lives in the Peasant War. Flourishing and populous districts were desolated. The lot of the defeated insurgents became harder than ever, and many burdens of the peasantry originated at this period. The cause of the Reformation also was very injuriously affected. See Sartorius, *Versuch einer Geschichte des Deutschen Bauernkriegs* (Berl. 1795); Ochsle, *Beiträge zur Geschichte des Deutschen Bauernkriegs* (Heilbronn 1829); Wachsmuth, *Der Deutsche Bauernkrieg*

(Leip. 1834); and Zimmermann, *Allgemeine Geschichte des grossen Bauernkriegs* (3 vols., Stuttg. 1841–43).

PEAS'LEE, Edmund Randolph, m.d., ll.d.: 1814, Jan. 22—1878, Jan. 21; b. Newton, N.H. He graduated from Dartmouth College 1836, studied medicine at Yale, and commenced practice at Hanover, N. H., 1841. He was prof. of anat. and surgery at Dartmouth College 1842–70, was also prof. at Bowdoin College 1845–60, and in the New York Medical College 1851–60. He removed to New York 1858, and resided there till his death. In 1872 he was appointed prof. of gynecology at Dartmouth College and at the medical college connected with Bellevue Hospital, New York, 1874. He was a prominent member of medical and gynecological societies, was a prolific writer for medical journals, and published *Human Histology* (1857) and *Ovarian Tumors and Ovariotomy* (1872).

PEA-STONE, or Pisolite, *pī'sō-līt*, or Pisiform Limestone, *pī'sĭ-fawrm:* kind of calcareous spar or limestone, which occurs in globules from one-eighth of an inch to half an inch in diameter, imbedded in a cement of similar substance. There is generally a grain of sand in the centre of each globule as the nucleus around which it has been formed; and the concentric plates of its structure are easily visible. Sometimes the nucleus is merely a bubble of air. P. is found in great masses near the hot springs of Carlsbad, in Bohemia. It is sometimes used for ornamental purposes.

PEAT, *pēt* [OE. *beating*, turf for fuel; *bete*, to mend or kindle a fire; *beats* or *peats*, the turfs consumed: AS. *betan*, to amend, to repair: Scot *beit*, to add, to supply]· natural accumulation of decayed vegetable substances in swampy districts, occurring in strata more or less deep. Peats, n. plu. *pēts*, peat cut into pieces of the shape and size of a brick, dried in the sun, and used as fuel. Peaty, a. *pēt'ĭ*, consisting of peat. Peat bog, an accumulation of peat more or less extensive, and soft and swampy. Peat moss, district covered with undisturbed peat soil. Peat soil, peat moss that has been reclaimed for agricultural purposes. —*Peat* is formed by decomposition of plants amid much moisture, as in marshes and morasses ; and sometimes described as a kind of *Humus* (q.v.), formed by the accumulation of the remains of mosses and other marsh-plants. The remains of the plants are often so well preserved in it, that the species can be easily distinguished. Reeds, rushes, and other aquatic plants may usually be traced in peat, and stems of heath are often abundant in it; but it chiefly consists, in the n. parts of the world, of different species of *Sphagnum* (q.v.), or Bog-moss. Mosses of this genus grow in very wet situations, and throw out new shoots in their upper parts, while their lower parts are decaying and being converted into P. ; so that shallow pools are gradually changed into bogs. It was formerly believed that bogs owed their origin to the destruction of forests, the fallen trees impeding the natural drainage, and causing the growth of those marsh-plants of which P. is formed; and this

theory was supported by reference to instances supposed to be authenticated by tradition—as that of the moor of Hatfield, in Yorkshire, England, now consisting of about 12,000 acres of P., and said to have been a forest of firs, till 'the Romans under Ostorius, having slain many Britons, drove the rest into the forest,' which was then destroyed by the victors. There are, however, satisfactory proofs that P. has accumulated in many places around trees; and firs remaining in their natural position have been found to have six or seven ft. of P. under their roots, though other trees, as oaks, are commonly found with their stumps resting on the soil béneath the P. Yet it is probable that the destruction of forests may, in some instances, by impeding the course of the streams which flowed through them, have caused the stagnation of water from which the growth of P. resulted. Some of the largest mosses and fens of Europe occupy the place of forests, which were destroyed by order of Severus and other Roman emperors; and some of the British forests, now mosses, as well as some of those of Ireland, were cut down because they harbored wolves or outlaws. The overthrow of a forest by a storm in the 17th c. is known to have caused the formation of a *peat-moss* near Loch Broom, in Ross-shire. Layers of trees are frequently found in P., which seem to have been suddenly deposited in their horizontal position, and sometimes to have been felled by human hands. It is probable, however, that sometimes P. has been formed where the soil has been exhausted by the long-continued growth of one kind of tree. The growth of P. is often rapid: bogs have been known to increase two inches in depth in a year. The surface of a bog sometimes becomes a floating mass of long interlaced fibres of plants, known in Ireland as *Old Wives' Tow*. The vegetation on the surface is sometimes very green and compact, like a beautiful turf.

P., being vegetable matter more or less decomposed, passes by insensible degrees into Lignite (q.v.). The less-perfectly decomposed peat is generally of brown color; that which is fully decomposed is often nearly black. Moist P. possesses a decided and powerful antiseptic property, which is attributed to the presence of gallic acid and tannin, and is manifested not only in the perfect preservation of ancient trees and of leaves, fruits, etc., but sometimes even of animal bodies. Thus, in some instances, human bodies have been found perfectly preserved in P., after the lapse of centuries.

The formation of P. is one of the most important geological changes now in evident progress. It takes place, however, only in the colder parts of the world. In warm regions, the decay of vegetable substances, after life has ceased, is too rapid to permit its formation. The surface covered by P. is very extensive in all colder parts of the world; though in the s. hemisphere no moss seems to enter into its composition; and the S. American P. is said by Mr. Darwin to be formed of many plants, but chiefly of *Astelia pumila*, phanerogamous plant of the rush family. The surface covered by P. even in England is considerable; it is

greater in Scotland, and very great in Ireland. Extensive tracts are covered with P. even in the s. countries of Europe, sometimes even near the sea; and in more northern regions, the *mosses* or *bogs* are still more extensive. For their physical characters, and the mode of *reclaiming* them, or converting them into arable land, see Bog.

Mere P. is not a good soil, even when sufficiently drained, but, by the application of lime, marl, etc., it is soon converted into good soil, yielding excellent crops. A mixture of P. is often a benefit to soils otherwise poor. And for many shrubs, as rhododendrons, kalmias, whortleberries, etc., no soil is so suitable as one in great part of peat.

P. is used extensively for fuel. The more perfectly decomposed the vegetable matter, and the more consolidated the peat therefore, the better is it suited for fuel. It is the ordinary fuel of great part of Ireland, and is there almost always called *turf*, though the term turf, in its ordinary English sense, is utterly unapplicable to it. To procure P. for fuel, the portion of bog to be operated upon must first be partially dried by a wide open drain; its surface is then pared off with the spade, to the depth of about six inches, to remove the coarse undecomposed vegetable matter; the P. is afterward cut out in pieces (*peats*) like bricks, by means chiefly of a peculiar implement, called in Ireland a *slane*, and in Scotland a *peat-spade*, resembling a long, narrow, sharp spade, the blade of which is furnished on one side with a tongue set at a right angle to it. This implement is used by the hands alone, without pressure of the foot. The soft peats are conveyed to some neighboring place, where they are set up on end in little clusters to dry. When sufficiently dry, they are conveyed away, and may be piled in outhouses or stacked in the open air. The operation of *peat-cutting* is performed in spring or summer.—Where P. for fuel cannot be obtained in the way above described, the black mud of a semi-fluid bog is sometimes worked by the feet of a party of men, women, and children until it acquires such a consistency that it can be molded by the hand. The process is laborious, but the fuel obtained by it is good. — In countries depending on P. for fuel, a very rainy season sometimes occasions great inconvenience, and even distress, by preventing the cutting and drying of the peat.

P. is a light and bulky kind of fuel, and cannot be conveyed to considerable distances without great expense. Efforts have been made, in Scotland and Ireland, to bring it into more general use, and so to promote the reclaiming of bogs, by compressing it until its specific gravity is nearly equal to that of coal: for this purpose, it is first reduced to a pulp. This process has not yet been advantageously prosecuted on an extensive scale.

P.-charcoal, made from uncompressed P., is very light and inflammable, and therefore unsuitable for many purposes, but for others it is particularly adapted, and no kind of charcoal excels it in antiseptic and deodorizing properties. It is also an excellent manure for many kinds

of soil, and great crops have been obtained by its use. P.-charcoal is highly esteemed for smelting of iron, and for working and tempering the finer cutlery. Charcoal made from compressed P. is in density superior to wood-charcoal, and is capable of being used as coke. The Irish Amelioration Soc., some years ago, encouraged the conversion of P. into charcoal, but it seems not to have succeeded as a commercial speculation, though the resulting charcoal was of good quality. The fact is similar regarding various companies formed for obtaining valuable products from the destructive distillation of P. It appears from researches of Sir R. Kane and others, that 1,000 parts of P. yield about 11 of sulphate of ammonia, 7 of acetate of lime, 2 of wood naphtha, 1 of paraffin, 7 of fixed oil, and 3 of volatile oil: see a Brit. parliamentary *Report on the Nature and Products of the Destructive Distillation of Peat*, 1851; and a paper by Dr. Paul, *The Chemical News*, VI. A more recent contribution to the subject is *The Peat Mosses of Buchan*—by the Rev. James Peter, minister of Deer (Aberdeen 1875).

Flower-pots are sometimes made of P. It is easy to transplant flowers growing in them without loosening the earth from the roots, the pot being readily cut to pieces; and liquid manure applied outside finds its way sufficiently to the roots.

PEA WEEVIL, or Pea-bug (*Bruchus pisi*): the most formidable destroyer of the pea, causing immense damage to the crop every year. It has been disseminated throughout the United States and introduced into Canada. The eggs are deposited on the young pods, and the grubs hatched from them work their way into the peas. As the peas grow, the holes are covered. The grub feeds on the substance of the pea, but does not attack the germ. Consequently, infested peas will grow, but as they do not produce vigorous plants they should not be sown if others can be obtained. In the spring the weevil goes forth to perpetuate its species. It can be killed before it leaves the seed by placing the peas in a closed vessel and subjecting them to the fumes of bisulphide of carbon, turpentine, or chloroform; by placing them, as soon as shelled, for a few seconds in boiling water; or by keeping them 2 or 3 days in a tight box with a quantity of insect powder, and shaking them occasionally. If the seeds are kept in a tight box till the second year the weevils will perish. The injury already sustained cannot be remedied, but if all infested peas were promptly treated the numbers of the pest would be speedily diminished, and it might eventually be exterminated.

PEBBLE, n. *pĕb'bl* [Dan. *pible*, to flow with small bubbles, to purl: Dut. *kabbelen*, to beat as waves upon the shore: As. *pabol*, a pebble; prob. allied to *bubble*, from the sound of water running among stones]: small, round, water-worn stone of any kind; but with jewellers and lapidaries sometimes an agate or a cornelian—since these are often found as loose pebbles in streams—those of Scotland in particular being popularly designated *Scotch Pebbles*.

Hence the name has come even to be extended to rock crystal, when not in the crystalline form, and we hear of spectacles with eyes of pebble, etc. Deposits of pebbles (in the sense of water-worn-stones) occur among the rocks of all periods, but the pebbles are seldom loose; they are generally cemented together by iron, lime, or silex, forming a pudding-stone of greater or less hardness. Single pebbles are sometimes found in deposits which have been formed at a distance from currents in perfectly still water, as in chalk and fine silt. They must have been floated to their places entangled in the roots of trees, or attached to the roots of large buoyant sea-weeds. — BRAZILIAN PEBBLES (so called from Brazil having been long famous for the purity of its rock crystal), are very pure pieces of Rock Crystal (q.v.), used by opticians for the lenses of spectacles, etc. PEB'BLED, a. *-bld*, covered or abounding with pebbles. PEBBLES, n. plu. *-blz*, a name given by lapidaries to various ornamental stones, differing much in color and appearance. PEB'BLY, a. *-blĭ*, full of pebbles.

PEBRINE, n. *pĕ'brĭn* [F. *pébrine*]: name in France for a disease of silk-worms, caused by minute organisms infesting their bodies in all stages of their existence: see SILK.

PECAN, or PECCAN, n. *pē-kăn'* [F. *pacane:* Sp. *pacana*]: a N. Amer. tree and its fruit: a kind of nut; the *Car'yŭ olivæfor'mis*, ord. *Juglandăcĕæ;* a species of Hickory (q.v.).

PECCABLE, a. *pĕk'ă-bl* [F. *peccable;* It. *peccabile*, peccable—from L. *peccab'ilis*—from *pecco*, I do amiss or transgress]: liable to sin; subject to transgress the divine law. PEC'CABIL'ITY, n. *-bĭl'ĭ-tĭ*, the state or quality of being subject to sin. PEC'CADIL'LO, n. *-dĭl'lō* [Sp. *pecadillo*, a slight fault—from *pecado*, a sin, an excess—from L. *peccātum*, a sin]: a petty crime or fault. PEC'CANT, a. *-kănt* [F.—L.]: sinning; guilty; corrupt; offensive; bad. PEC'CANTLY, ad. *-lĭ*. PEC'CANCY, n. *-ăn-sĭ*, bad quality; offense.

PECCARY, n. *pĕk'ă-rĭ* [a S. Amer. name: F. *pécari*, a peccary] (*Dycoteles*); genus of *Pachydermata*, of the family *Suidæ*, much resembling hogs; but having a mere tubercle instead of a tail; only three toes—no external toe—

Peccaro (*Dycoteles torquatus*).

on the hind-feet; the molar teeth and incisors very like those of hogs, but the canine teeth not nearly so long, and not curving outward. An approach to ruminants is seen in the stomach, which is divided into several sacs; also in the union of the metacarpal and metatarsal bones of the two greater toes into a kind of cannon bone. A glandular opening on the loins, near the tail, secretes a fetid humor. Only two species are known, both natives of S America; and except the tapirs, the only existing pachydermata of the American continent.—The Common P., Collared P., or Tajaçu (*D. torquatus*), is found in almost all parts of S. America, and ranges n. to the Red river of Ark. The White-lipped P. (*D. labiatus*) is found in many parts of it. Both are gregarious; the White-lipped P., often assembling in very large herds, sometimes doing great mischief to maize and other crops. The herds of the White-lipped P. seem to follow a leader, like those of ruminants. The Common P. chiefly frequents forests, and small companies sometimes take up their abode in the hollow of a great tree. It is about 36 inches long, grayish; the hairs alternately ringed with black and yellowish white, bristly; and on the neck longer, and forming a mane. A narrow white collar surrounds the neck. The White-lipped P. is considerably larger, of darker color, with conspicuously white lips. The ears are almost concealed by the hair. Both species are capable of being tamed, but are of irritable and uncertain temper. In a wild state White-lipped defend themselves vigorously against assailants, making good use of their sharp tusks, and a whole herd combine for defense. The hunter has often to take refuge from them in a tree. Peccaries are omnivorous; and though hurtful to crops, render service by destroying reptiles. Their voice is somewhat like that of a hog, but more sharp. Their flesh resembles pork, but it is said to be inferior. The glands on the loins must be cut out immediately after the P. is killed, or their fetid humor infects the whole flesh. No attempts seem yet to have been made for economic domestication of the peccaries.

PECCAVI, n. *pĕk-kā'vī* [L. I have sinned]: a word confessing error; an admission of having done wrong.

PECHBLENDE, n. *pĕch'blĕnd* [Ger. *pech*, pitch; *blende*, a blind]: an ore of uranium and iron—another name for Pitchblende, which see under Pitch 1: also called Pechurane. *pĕch-ū-rān'*.

PE-CHIH-LE': see Chih-le.

PECK, v. *pĕk* [Sp. *picar*, to peck, to nibble: F. *bec*, the beak of a bird; *becquer*, to peck with the beak—from mid. L. *beccus*, a beak: It. *becco*, the beak of a bird]: to strike with the beak, as a bird; to pick up food with the bill or beak; to dig or strike lightly with a pointed instrument. Peck'ing, imp. Pecked, pp. *pĕkt*. Peck'er, n. *-ėr*, one who or that which pecks. Woodpecker, a bird that pecks insects out of trees. To peck at, to attack with petty and repeated criticism.

PECK, n. *pĕk* [F. *pieotin*, a peck; *pic*, a measure for flour containing about four of our pecks: comp. Gael. *peic;* Ir. *peae*, a peck]: measure of capacity for certain classes of goods, such as grain, fruit, etc., equivalent to 2 imperial gallons, or 554·548 cubic inches: it is thus the fourth part of a bushel (q.v.).

PECK, Harry Thurston, educator, critic, and encyclopedist: b. Stamford, Conn., 1856, Nov. 24. Having acquired a preparatory education in private schools, he entered Columbia College and was graduated thence, 1881, receiving at various dates the degrees of A.M., PH.D., L.H.D., and LL.D. He also studied at Berlin, Paris, and Rome; and in 1888 was made Prof. of Latin in Columbia College, having previously been instructor in the same institution. On the establishment of the *Amerieau Bookman* in 1895 he became editor-in-chief, and has retained that position to the present time. He was for a while literary editor of the *Commercial Advertiser* of New York, and in 1898 he edited the *International Encyclopedia*, filling the same position on the *New International Encyclopedia* in 1900; he also edited *The Students Series of Latin Classics*, Harper's *Dictionary of Classieal Literature and Antiquities*, the *American Atlas of the World*, and *Masterpieees of Literature*. His studies have embraced a wide range of subjects, and he is regarded as one of the foremost American authorities on the early history of the novel. Among his publications are, *The Semitic Theory of Creation* (1887); *Suetonius, with Commentary* (1889); *A Manual of Latin Pronuneiation* (1892); *Roman Life* (1895); *The Personal Equation*, essays (1897); *What is Good English, and Other Essays* (1898); *Graystone and Porphyry*, verse (1900); *The Life of Prescott* (1904); and *Twenty Years of the Republie* (1906).

PECK, *pĕk*, Jesse Truesdell, D.D.: bishop of the Meth. Episc. Chh.: 1811, April 4—1883, May 17; b. Middlefield, Otsego co., N. Y. He was educated at Cazenovia Seminary; became local preacher 1829, member of Oneida conference 1832; principal of Gouverneur Seminary 1837–41; of Troy Conference Acad. 1841–48; and pres. of Dickinson Coll., Penn., 1848–52. He was pastor of the Foundry Church, Washington, D. C., 1852–54; then sec. of the Meth. Episc. Tract Soc. in New York; and 1856–58 pastor of the Green Street Church there. He next served as pastor in San Francisco and Sacramento, Cal., 1859–66. He returned to N. Y., and was pastor at Peekskill, Albany, and Syracuse, till 1872; was chief founder of the Syracuse Univ.; was made bp. 1872. His chief works are *The Central Idea of Christianity* (1855), *The True Woman, or Life and Happiness at Home and Abroad* (1857), *What must I do to be Saved?* (1858), and *The History of the Great Republic considered from a Christian Standpoint* (1868).

PECK, John James: 1821, Jan. 4—1878, Apr. 21; b. Manlius, N. Y. He graduated from West Point Acad. 1843, and served with great credit in the Mexican war. His name was honorably mentioned in the official report

of several battles, he was brevetted capt. and major for brilliant service, and was presented a sword on his return home. He resigned from the army 1853, became connected with a railroad enterprise, was cashier of a bank in Syracuse, and became prominent in political circles. In the civil war he served with distinction at Yorktown, Fair Oaks, and other important points, commanded in N. C. and on the Canada border, was made brig.gen. vols. 1861, maj.gen. 1862, and was mustered out of the service 1865. He became pres. of a life-insurance co. in Syracuse, and retained the position till his death.

PECK, WILLIAM GUY, PH.D., LL.D.: 1820, Oct. 16; b. Litchfield, Conn. He graduated from West Point at the head of the class with Ulysses S. Grant 1844, was an engineer in Fremont's third expedition 1845, asst. prof. at West Point 1846–55; but meanwhile served in the Mexican war. He resigned his commission 1855, became prof. in the Univ. of Michigan, was adjunct prof. of math. in Columbia College 1857–61, and in the latter year became prof. of math., mechanics, and astron. in that institution, which position he held till death. Besides assisting in the compilation of Davies' *Dictionary and Cyclopædia of Mathematical Science*, and editing Ganot's *Natural Philosophy*, *Elementary Mechanics*, and *Popular Astronomy*, he has published a complete series of text-books on pure and applied mathematics. He died Feb. 7, 1892.

PECKHAM, RUFUS W.: jurist: 1838, Nov.— — ——; b. Albany, N. Y. His father, of the same name, was judge of the N. Y. court of appeals. He studied law in his father's office, and took a course at the Albany Acad. Admitted to the bar 1859, he became one of the firm of Peckham & Tremain. He was elected 1869 dist. atty., and also served by appointment as corporation counsel. In 1883 he was elected justice of the N. Y. supreme court, and in 1886 assoc. judge of the court of appeals. In 1895 he was appointed assoc. justice of the U. S. supreme court, in place of Howell E. Jackson, deceased, and was confirmed by the senate without opposition. His decisions have been characterized by vigor of thought and terseness and force of expression.

PECOPTERIS, n. *pĕ-kŏp'tĕr-ĭs* [Gr. *pekō*, I comb; *pteris*, a fern]: in *geol.*, an extensive genus of fossil ferns found in the coal measures, so named from the regular comb-like arrangement of the leaflets.

PECORA, *pĕk'o-rȧ* [Lat. cattle]: Linnæan order of Mammalia, now generally called RUMINANTIA (q.v.).

PECOS, *pā'kōs*, RIVER: stream in Texas, rising in the mountains near Santa Fé, N. Mex., running s.e. 600 m. through N. Mex. and Tex., and flowing into the Rio Grande-del-Norte, lat. about 29° 20′ n., long. 102° west.

PECS: see FÜNFKIRCHEN.

PECTATE, n. *pĕk'tāt* [Gr. *pēktos*, coagulated, curdled]: a salt of *pectic acid*. PECTIC ACID, an acid obtained by a small addition of potash to pectin; an acid formed from pectin and a base (see FRUIT). PECTIN, n. *pĕk'tĭn*, the

gelatinizing principle of fruits and vegetables; a substance resulting from the action of an acid, or a ferment, on pectose; by the action of a ferment with a gentle heat *pectin* is first transformed into *pectosic acid*, and afterward into *pectic acid* (see FRUIT). PECTOSE, n. *pĕk-tōs′*, substance supposed to form the bulk of vegetable jelly, the elemental qualities of which may be equal to the starches (see FRUIT). PECTASE, n. *pĕk′tās*, a substance present in the juices of plants.

PECTEN, n. *pĕk′tĕn* [L. *pecten*, a comb]: genus of bivalves, commonly called clams (see below): vascular membrane in the eyes of birds. PECTINAL, a. *pĕk′tĭn-ăl*, pertaining to or resembling a comb. PEC′TINATE, a. *-āt*, or PEC′TINATED, a. *-ā-tĕd*, having a form resembling the teeth of a comb. PEC′TINATELY, ad. *-lĭ*. PEC′TINA′TION, n. *-ā′shŭn*, state of being pectinated. PEC′TINE′AL, a. *-ē′ăl*, in *anat.*, applied to a line forming a sharp ridge on the pubic bone of the pelvis.

PECTEN, *pĕk′tĕn:* genus of lamellibranchiate mollusks, commonly referred to the same family with the oyster (*Ostreadæ*); called sometimes *Pectinidæ*. The shell has neither teeth nor laminæ in the hinge; the valves are unequal, one of them often much more convex than the other; the shape is regular; the hinge is extended by *ears*, and in most of the species both valves have ribs radiating from the umbo to the margin. Hence the name *pecten* [Lat. comb], from their appearance. The animal has a small foot; some of the species are capable of attaching themselves by a byssus; they are capable also of locomotion by opening and rapidly closing the valves, and in this way can even regain the sea from a short distance by leaping on the shore. Some of the larger species are often popularly called *clams*, a name shared by other bivalves. *P. Jacobæus*, native of the Mediterranean, is the SCALLOP-SHELL, which pilgrims were accustomed to wear in front of the hat, in token of their having visited the shrine of St. James at Compostella. It attains a size of about 4 inches long and 5 inches broad. Species are found in almost all parts of the world.

Pecten.

PECTIC ACID, PECTIN: see under PECTATE.

PECTINIBRANCHIATA, n. *pĕk′tĭn-ĭ-brăng′kĭ-ā-tă* [L. *pecten*, a comb; Gr. *brang′chĭă*, gills]: order of gasteropodous mollusks, having the gills composed of numerous leaflets or fringes, arranged like the teeth of a comb, and affixed to the internal surface of a cavity which opens with a wide opening above the head. The sexes are distinct. All the P. have two tentacles and two eyes, the eyes often stalked. The mouth is produced into a proboscis, more or less lengthened. The eggs are deposited

in a mass, with an envelope often of very remarkable and complicated form, which is produced by coagulation of a viscous albuminous matter secreted by a peculiar gland of the female. The P. are very numerous; the greater number of gasteropods being included in this order; some have a siphon, and some are destitute of it; some have spiral, and some have simply conical shells. Almost all are inhabitants of the sea or its shores; a few are found in fresh water. To this order belong Whelks, Periwinkles, Cones, Volutes, *Calyptraeæ*, etc. PEC'TINIBRAN'CHIATE, a. *-kĭ-āt*, having the gills in a comb like form. PECTIN'IFORM, a. *-fawrm* [L. *pecten*, a comb; *forma*, shape]: resembling a comb.

PECTOLITE, n. *pĕk'tō-līt* [Gr. *pektos*, compacted, curdled; *lithos*, a stone]: a zeolitic mineral consisting of silicate of lime and soda, crystals of a white or grayish-white color, and somewhat silky lustre, having a starlike arrangement of its crystals.

PECTORAL, a *pĕk'tŏ-răl* [F. *pectoral*—from L. *pectorālis*—from *pectus*, a breast, *pectoris*, of the breast]: pertaining to a breast; good for the chest or lungs: N. a breast-plate, applied to that of the Jewish high-priest; a medicine to relieve complaints of the chest; one of the breast-fins of a fish. PECTORAL FINS, the two fore fins near the gills of a fish.

PECTORILOQUISM, n. *pĕk'tō-rĭl'ō-kwĭzm* [L. *pectus*, the breast; *pectŏris*, of the breast; *loqui*, to speak]: the act of speaking from the chest. PEC'TORIL'OQUY, n. *-ō-kwĭ*, in *med.*, the apparent issuing of the voice from that part of the chest to which the ear or stethoscope is applied: term of frequent occurrence in the history of chest diseases. If the stethoscope be applied to the chest of a healthy person, and he be requested to speak, the sounds of his voice will be conveyed to the ear of the observer with very different degrees of clearness, according to the part of the chest on which the base of the instrument rests. If, for example, it be applied at the top of the sternum or breast-bone the voice will reach the ear, through the tube, with considerable distinctness. For a short distance on either side of the sternum, just below the collar-bones, and in the arm-pits, the voice is still heard, but the sound is indistinct and confused. Below the third rib, and over the remainder of the chest, the voice produces only an obscure thrilling sound known as *pectoral resonance*. In certain morbid conditions the sounds of the voice seem to proceed with distinctness from the walls of the chest directly into the ear; and then, in place of the normal pectoral resonance, we have the physical sign known as Pectoriloquy [from the Latin *pectore*, from the chest, and *loquor*, I speak]. It occurs when a tolerably superficial excavation, of moderate or considerable size, lies under the stethoscope; and hence it was at one time regarded as an almost certain indication of advanced consumption, but it is now known that it may also occur when solidified masses of lung lie between a large bronchial tube and the part of the chest on which the instrument rests.

PECTOSE: see under PECTATE.

PECULATE, v. *pĕk'ū-lāt* [L. *peculātus*, an embezzlement of public money—from *peculium*, private property; *pecunia*, money: It. *peculato;* F. *péculat*, theft of public money]: to appropriate public money to one's own use; to defraud by embezzlement; to steal. PEC'ULATING, imp. PEC'ULATED, pp. PEC'ULA'TION, n. *-lā'shŭn*, the applying to one's own private use of public money or goods. PEC'ULA'TOR, n. *-tėr*, one who embezzles public money.

PECULIAR, a. *pē-kūl'yėr* [OF. *peculier*, peculiar, particular—from L. *peculĭāris*, one's own, belonging to one—from *pecūlĭŭm*, that which one has as his own: It. *peculiare*]: pertaining to one, not to many; one's own; appropriate; unusual; strange: N. exclusive property: in *Eng. law*, a particular parish or church having jurisdiction within itself, and exempted from the jurisdiction of the bishop of the district; about 300 'courts of peculiars' in such jurisdictions in England and Wales still exercise a jurisdiction, recently limited, but somewhat obscure as to its extent. PECUL'IARLY, ad. *-lĭ*, in a manner not common to others. PECUL'IAR'ITY, n. *-yăr'ĭ-tĭ*, something that belongs or is found in one person, thing, class, system, people, etc., and in no other. PECUL'IARIZE, v. *-yėr-īz*, to appropriate; to make peculiar. PECUL'IARI'ZING, imp. PECUL'IARIZED, pp. *-īzd*. PECU'LIUM, n. *-ŭm*, in *anc. Rome*, the property which a slave might possess independent of his master. COURT OF PECULIARS, a branch of the court of arches.—SYN. of 'peculiar, a.': special; especial; particular; personal; private; individual; singular.

PECUL'IAR PE'OPLE, n.: in *chh. hist.*, Protestant sect of recent origin, found mostly in Kent, England, and to a less extent in other counties round London. They recognize no sacraments or creeds, and claim to be the real exemplars of true and undefiled religion. They accept the exhortation of the Apostle James (v. 14, 15) in a strictly literal sense, and this has more than once led to a verdict of manslaughter being returned against some of their members by a coroner's jury. The name apparently has reference to I. Peter ii. 9.

PECUNIARY, a. *pĕ-kū'nĭ-ă-rĭ* [F. *pécuniaire*, pecuniary—from L. *pecūnĭārĭŭs*, of or belonging to money—from *pecūnĭă*, riches, wealth, originally property in cattle—from *pecus*, cattle: It. *pecuniario*, pecuniary]: relating to or consisting of money. PECU'NIARILY, ad. *-ă-rĭ-lĭ*, as relating to or consisting in money. PECUNIOUS, a. *pĕ-kū'nĭ-ŭs*, having abundance of money; wealthy.

PEDAGOGUE, n. *pĕd'ă-gŏg* [F. *pédagogue*—from L. *pædăgōgŭs;* Gr. *paidagōgos*, a slave who took children to school, and had charge of them at home—from Gr. *pais*, or *paida*, a child: *agō*, I lead; *agōgŏs*, leading]: a schoolmaster—now used generally by way of contempt to designate a pedant; one whose occupation is to instruct young children. PEDAGOGIC, a. *pĕd'ă-gŏj'ĭk*, or PED'AGOG'ICAL, a. *-ĭ-kăl*, pertaining to a teacher of children, or to the art of teaching. PED'AGOGISM, n. *-ĭzm*, the business and manners of a pedagogue; pedantry. PED'AGOGY, n. *-gōjĭ*, preparatory discipline; ways or work of a pedantic teacher.

PEDAL, n. *pĕd'ăl* [F. *pédale*—from L. *pedālis*, of or belonging to a foot—from L. *pedis*, of a foot: Gr. *podos*; Skr. *pâda*, a foot: It. *pedale*, a pedal]: any part of a musical instrument acted on by the feet. The pianoforte, the harp, and the organ are furnished with pedals, which, however, serve an entirely different purpose in each instrument. In the pianoforte, their use is to effect a change in the quality or intensity of the sound; the damper pedal prolongs the sound after the finger is lifted from the key, and the shifting or *una corda* pedal softens the tone. The pedals of the harp are the means by which the chromatic changes of intonation are effected. In the organ, the pedals are keys put in action by the feet. The division of the organ which is connected with the foot-keys is called the pedal-organ, and contains the largest pipes. The introduction of pedals in the organ is assigned to a German of the name of Bernhard, 15th c.; few organs now, except the smallest, are made without them. Pedals are used in the organ also to act on the swell and on stops: see ORGAN. PEDAL, a. pertaining to a foot; played or produced by the foot, as certain large pipes in an organ. PEDAL NOTE, a holding-note. PEDAL-POINT, or PEDAL HARMONY (see ORGAN-POINT, under ORGAN).

PEDALIA'CEÆ: see BIGNONIACEÆ.

PEDALIER, n. *pĕd'a-lēr:* same as Pedalion, in music.

PEDALION, n. *pē-dā'lĭ-on* [Gr. *pēdalion*, a rudder]: in *zool.*, a genus of Rotifera, family *Flosculariдæ*.

PEDALION, n. *pē-dā'lĭ-on* [L. *pedalis*, pertaining to the foot]: in *mus.*, a set of pedals acting upon strings, producing notes of a deep pitch, so constructed as to be capable of being used with a pianoforte.

PEDANT, n. *pĕd'ănt* [F. *pédant*—from It. and Sp. *pedante*, a pedant]: one who makes a vain and ostentatious display of his learning. PEDANTIC, a. *pĕ-dăn'tĭk*, or PEDAN'TICAL, a. *-tĭ-kăl*, vainly displaying or making a show of knowledge. PEDAN'TICALLY, ad. *-lĭ*. PEDANTRY, n. *pĕd'ăn-trĭ*, a vain and offensive display of knowledge. *Note.*—Said to be connected with L. *pedārĕ*, to foot it, to tramp about, as if a *pedant* was 'one who tramped about with children at his heels.' The word is most probably derived from Gr. *paideuō*, I instruct.

PEDATE, a. *pĕd'āt* [L. *pedātus*, footed—from *pedes*, feet]: in *bot.*, having divisions like the feet, an epithet applied to certain palmate leaves, as in hellebore.

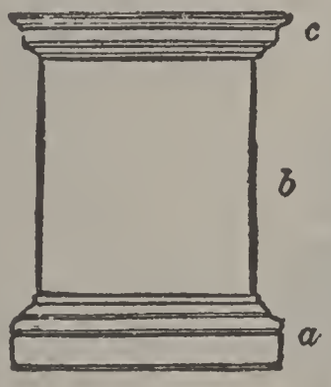
PEDATIFID, a. *pĕ-dăt'ĭ-fĭd* [L. *pedātus*, footed; *findo*, I divide; *fĭdī*, I have divided]: in *bot.*, applied to a leaf whose parts are not entirely separate, but divided as a pedate one; irregularly lobed, said of a leaf. PEDATINERVED, a. *pĕ-dăt'ĭ-nėrvd* [L. *nervus*, a nerve]: in *bot.*, having the veins of a leaf arranged in a pedate manner. PEDATIPARTITE, a. *pĕd'ă-tĭ-pâr'tĭt* [L. *partītus*, divided]: in *bot.*, having the venation of a leaf pedate, and the lobes almost free.. PEDAT'ISECT, a. *-ĭ-sĕkt* [L. *sectus*, cut or divided]: in *bot.*, applied to the veining of a leaf when it is pedatifid, and the lobes extend nearly to the midrib.

PEDDLE, v. *pĕd'dl* [prov. Eng. *ped*, pannier or wicker-basket; *pedder* or *pedlar*, one who carries on his back goods in a *ped* for sale, a packman]: to sell in a small way, as a pedler; to be busy about trifles; to engage as a pedler. PED'DLING, imp. travelling about selling small wares: ADJ. trifling; unimportant: N. the occupation of a pedler. PED'DLED, pp. *-dld*. PED'LER, or PED'DLER, or PED'LAR, n. *-lẽr*, one travelling the country, chiefly on foot, selling goods and small wares (see HAWKER). PED'DLERY, n. *-dlẽr-ĭ*, goods or small wares sold by pedlers. *Note.*—PEDDER is the Scot. for PEDLER: probably PEDLER is derived really from L. *pedis*, Gr. *podos*, of a foot, Skr. *pâda*, a foot, thus meaning a merchant travelling on foot—*ped*, the OE. and Scot. for 'basket,' deriving its name from the fact of being carried by a *pedler*.

PEDEE, *pē-dē'*, GREAT: river of N. and S. C.; rising in the Alleghany Mts. in n.w. N. C., flowing s. by e. through e. S. C., and entering the Atlantic through Winyaw Bay at Georgetown. It is navigable to Cheraw, 150 m., and is about 350 m. long.—LITTLE PEDEE, its principal e. branch, is formed by the confluence of several smaller rivers in s. N. Carolina.

PEDE-MAT, n. *pēdmăt* [L. *pēs* or *pĕdem*, a foot]: a mat for the feet; chiefly a sort of carpet in close proximity to the communion-table: also called a PEDE CLOTH.

PEDESTAL, n. *pĕd'ĕs tăl* [Sp. *pedestal;* F. *piédestal*—from It. *piedestallo*, a pedestal—from It. *piede;* L. *pes* or *pedem*, a foot; It. *stallo*, a standing, a permanent situation—from L. *sto*, I stand]: the base or substructure of a column or statue; a permanent base on which to place anything. The pedestal is much used in classic architecture. Like the column, it has a base, *a*, and a sort of capital or cornice, called the surbase, *c*. The shaft, or plain block, *b*, is called the dado or die.



Pedestal.

PEDESTRIAN, n. *pĕ-dĕs'trĭ-ăn* [L. *pĕdester*, on foot, pedestrian—from *pes* or *pĕdem*, a foot: It. *pedestre:* F *pédestre*]: one who performs a journey on foot; one noted for his powers of walking; a professional walker: ADJ. performed on foot; walking. PEDES'TRIAL, a. *-ăl*, pertaining to the foot. PEDES'TRIANISM, n. *-ăn-ĭzm*, the art or practice of walking; journeying or racing on foot.

PEDETES, *pē-dē'tēz*, or HELAMYS, *hĕl'â-mĭs:* genus of rodent quadrupeds of family *Muridæ*, allied to Jerboas, but differing from them in some characters of their dentition. The hind-legs, though very long, are not so long as in the jerboas. The tail is long. The JUMPING HARE (*P.* or *H. Capensis*) of s. Africa is about the size of a rabbit: it can jump 20 or 30 ft. at a bound. Its fore-feet also are very strong, and it burrows very expeditiously.

PEDICEL, n. *pĕd'ĭ-sĕl*, or PEDICLE, n. *pĕd'ĭ-kl* [F. *pédicule* or *pédicelle*—from L. *pedic'ulum*, a small foot-stalk—from *pĕdem*, a foot]: a small, short foot-stalk of a leaf, flower, or fruit; the foot-stalk or stem by which certain lower animals are attached. PED'ICEL'LATE, a. *-sĕl'lāt*, supported by a pedicel.

PEDICELLARIÆ, *pĕd-ĭ-sĕl-lā'rĭ-ē:* very remarkable minute appendages of the integuments of many of the Echinodermata; having the form of a stalk, with a small two-bladed or three-bladed forceps at its summit. They are of fleshy substance, with calcareous granules imbedded, and in a living state the blades are continually opening and closing. They were at one time supposed to be parasitic zoophytes, but are now generally believed to be organs of the star-fish or sea-urchin, though their use is merely conjectured to be that of keeping the surface of the echinoderm free of algæ and zoophytes. The introduction of a pin's point between the blades causes an immediate closing of them. They are found both on shelly and on comparatively soft integuments, and are always present, and always of a particular form, according to the species of echinoderm, and according to the particular place which they occupy, being crowded chiefly around the spines, and near the mouth of sea-urchins.

Lousewort (*Pedicularis palustris*):
a, corolla cut open, showing the stamens; *b*, fruit, *c*, pistil.

PEDICULARIS, *pē-dĭk-ū-lā'rĭs:* genus of herbaceous plants of nat. order *Scrophulariaceæ*, some of which have large and finely-colored flowers. Two species, *P. palustris*

and *P. sylvatica*, natives of Britain, common in wet grounds, have received the name of Lousewort, English equivalent of 'pedicularis,' from their supposed influence in producing the lousy disease in sheep; an influence purely imaginary. Their acridity renders them injurious to sheep which eat them. Continental Europe and Asia produce many other species, and some are found in N. America. *P. sceptrum*, or King Charles's Sceptre, is a principal ornament of marshy grounds in the most northern countries of Europe.

PEDIFORM, a. *pĕd'ĭ-fawrm* [L. *pĕdem* a foot; *forma*, shape]: shaped like a foot.

PEDIGEROUS, a. *pĕ-dĭj'ér-ŭs* [L. *pĕdem*, a foot; *gero*, I carry or bear]: having feet; furnished with footlike organs.

PEDIGREE, n. *pĕd'ĭ-grē* [OE. *pedigru* and *petegreu*, also *pe-de-gre*, a line of kindred; prob. from L. *pes* or *pedem*, foot]: list or register containing the line of ancestors from which a person or family is descended; genealogy; lineage; the same list made more full, and often representing, in tabular form, the relations in which the members of a family stand to each other, accompanied or unaccompanied by a notice of the chief events in the life of each, with their dates, and the evidence of the facts stated. *Note.*—Wedgwood gives F. *pied* in the sense of tree, so that *pied-de-gres* would thus signify a tree of degrees. Skeat's derivation from F. *pied-de-grue*, crane's foot, the heraldic tree being generally crooked, seems improbable.—Pedigrees are indispensable aids to the student of history. The wars of the Roses, the claim of Edward III. to the crown of France, the relative position of Mary and Lady Jane Grey, the circumstances which brought about the union of the crowns of England and Scotland, the Slesvig-Holstein question, which occupied the attention of all Europe, and many other familiar chapters in the history of nations, as well as of families, cannot be read aright without the aid of pedigrees. The materials for formation of a P. are notes of the facts to be set forth, and a recognized series of signs and abbreviations. These notes comprise the name of every person who is to appear in the P., with dates and circumstances desirable for record. Among the commonest abbreviations are *dau.*, for daughter of; *s.* and *h.*, son and heir of; *coh.*, coheir of; *w.*, wife of; *sp.* (*sine prole*), without issue; *v. p.* (*vitâ patris*), in his father's lifetime; *b.*, born; *d.*, died; *dep.*, deposed; K., king; E, earl, etc. The sign = placed between two names, indicates that they were husband and wife; a downward-pointing arrow under a name signifies that the person had children. All persons of the same generation are to be kept in the same horizontal line; and the main line of descent is, wherever possible, to be indicated by keeping the successive names in a vertical column. Continuous lines indicate the succession of the different generations. The members of the same family in one generation are arranged usually in their order of birth in two groups—sons first, then daugh-

ters; but where the same father or mother has children by more than one marriage, the children of each marriage ought to form distinct groups. The actual arrangement, however, of a P. must always depend on the leading object which it is intended to illustrate.

Tabular genealogies, generally brief, and meant to illustrate some particular claim of right, are found among the records, public and private, of the early middle ages; but after the incorporation of the English Heralds' College, far more attention was given to the compilation of pedigrees of families, with reference particularly to their claims to dignities and heraldic insignia. In the 16th c., the heralds obtained copies of all such accounts of the English families of any distinction as could be supplied to them, and entered them in the books which contain their official records. Royal commissions were issued under the Great Seal to the two provincial kings-of-arms, empowering them to visit in turn the several counties of England, in order to collect from the principal persons of each county an account of the changes in their respective families in the interval since the last preceding visitation, and to inquire what account could be given of themselves by families who had stepped into the rank of gentry, or had become settled in the county since that period. The register-books kept by the heralds and their assistants contain the pedigrees and arms collected in the course of the visitations, with the signatures of the heads of the families. The pedigrees thus collected contain a vast body of information, interesting not only to the professed genealogist, but to every one who would know anything of the distinguished characters in English history. Some of these books are lost, the rest are scattered among the public and private libraries of the country, the largest collections being in the archives of the College of Arms and the British Museum. After the beginning of the 18th c., the visitations were discontinued, and there has since been no official and regular collection of pedigrees. Persons frequently record their pedigrees for preservation in the Register of the College of Arms. This register is quite distinct from the heraldic department of that institution, and is open to any one who wishes to preserve evidence of any properly authenticated facts regarding his descent and family. PEDIGREE, in law, is the legal relationship between individuals which is looked to with regard to the descent of property and honors. See INTESTACY: NEXT OF KIN: SUCCESSION.

PEDILUVIUM, n. *pĕd'ĭ-lô'vĭ-ŭm* [L. *pēs* or *pĕdem*, a foot; *luo*, I wash]: a foot-bath; the bathing of the feet.

PEDIMENT, n. *pĕd'ĭ-mĕnt* [unascertained: Skeat suggests a supposed L. *pedamentum*, a stake or prop—from *pedārĕ*, to furnish with feet, to prop]: space filled with stone over the portico at the ends of the roof of classic buildings. It is inclosed below by the horizontal cornice and above by the *raking* cornice, the latter following the slopes of the roof. The P. may be called the gable of classic buildings. It is frequently enriched with sculpture, for which it forms a fine setting. The doors and windows of classic buildings are often surmounted by pediments, either straight-sided or curved. The term may denote also the finishing stone of the front elevation of a building; similar crowning ornament of a piece of furniture, etc.

PEDIPALPOUS, a. *pĕd'ĭ-păl'pŭs* [L. *pēs* or *pĕdem*, a foot; *palpo*, I feel; *palpi*, feelers]: applied to certain arachnida having feelers in the form of pincers, or armed with two claws, as the scorpions—the order is called PED'IPALPS, *-pălps*, or PED'IPAL'PI, n. plu. *-păl'pī*.

PEDLAR, or PEDLER, n. *pĕd'lĕr*: see PEDDLE and PEDLER.

PEDO-, prefix *pē-dō-* [Gr. *pais*, gen. *paidos*, a boy, a child]: relating to or connected with children.

PEDOBAPTISM, n. *pē'dō-băp'tĭzm* [Gr. *pais* or *paida*, a child; *baptismos*, baptism]: the baptism of infants or of children. PE'DOBAP'TIST, n. *-băp'tĭst*, one who holds the Scriptural character of infant baptism: see BAPTISM, INFANT.

PEDOMANCY, n. *pĕd'ō-măn'sĭ* [L. *pēs* or *pĕdem*, a foot: Gr. *manteia*, divination]: divination from the examination of the lines of the soles of the feet.

PEDOMETER, n. *pĕ-dŏm'ĕ-tĕr* [L. *pēs* or *pĕdem*, a foot; Gr. *metron*, a measure]: instrument worn in the pocket, by which the distance passed over in a given time by a pedestrian is ascertained: it sometimes has a watch or clock attached; and it is in the form of a watch with a dial-plate marked for miles and fractions of miles. Each step, causing by its movement the fall of a hanging weight, registers itself by the movement of the hands on the dial. The weight, forced back by a delicate spring to a horizontal position, is released by each step. After a measured mile or other known distance has been walked, and the resulting indication on the dial observed, the instrument can be set accordingly to correspond with the average pace. The P. gives an approximate measurement, but cannot be depended on for accuracy. See ODOMETER. PED'OMET'RICAL, a. *-rĭ-kăl*, pertaining to or determined by a pedometer.

PEDONOSOLOGY, n. *pē-dō-nŏ-sŏl'o-jĭ* [prefix *pedo-*; Gr. *nosos*, disease; *logos*, discourse]: st dy of the diseases of children or infants.

PEDOTROPHY, n. *pē-dŏt'ro-fĭ*, or PEDOTROPHIA, n. *pē-dō-trŏf'ĭ-a* [Gr. *pais*, *paidos*, a child; *trephō*, I rear]: that branch of hygiene which deals with the nourishment of infants and children.

PE'DRO I., King of Castile and Leon: see PETER THE CRUEL.

PEDRO, *pē'dro* or *pā'dro*, I. (Dom PEDRO DE ALCANTARA), Emperor of Brazil: 1798, Oct. 12—1834, Sep. 24 (reigned 1822–31); b. Lisbon, Portugal; second son of John VI., King of Portugal. On the death of his elder brother 1801, he became Prince of Beja, and heir to the throne; and after his father's accession to the throne of Portugal and Brazil 1816, he received the title Prince of Brazil. He was carried with the royal family of Portugal in their flight to Brazil 1807, and from that time remained in that country. In 1817 he married Archduchess Leopoldine of Austria, and on his father's return to Lisbon, 1821, was named regent of Brazil. The Brazilians had become greatly disgusted with the illiberal methods of Portuguese rule P., though arbitrarily ordered to return at once to Portugal for completion of his education, cast in his lot with the Brazilians, despite threats of exclusion from the throne of Portugal, and was chosen emperor of Brazil. His government was vigorous, but a war which broke out between his supporters and the advocates of republicanism distracted the country. In 1826 he succeeded to the throne of Portugal; and the Brazilian discontent was renewed in the prospect that Brazil would be again reduced to a dependent state. P.'s hasty temper led him to measures which increased the discontent. But he retained the dignity of king of Portugal only long enough to show his right to it, and, after granting a more liberal constitution, immediately resigned in favor of his daughter Maria II. The disturbances in Brazil still increased, the finances fell into disorder, the emperor's second marriage with Princess Amelia of Leuchtenburg displeased his subjects, and, after various ineffectual attempts to restore tranquillity, he was compelled, by the revolution of 1831, July, to resign the throne in favor of his son Pedro II. (q.v.), a boy 5½ years old. P. then sailed for Portugal, where his brother Miguel had usurped the throne; and with the aid of an army swelled by French and English volunteers, after a three years' campaign, he drove away the usurper, and restored his daughter to the throne. But ceaseless excitement and struggle had produced exhaustion, which ended in his death. See BRAZIL: MIGUEL, Dom: PEDRO II. (Dom PEDRO DE ALCANTARA). PORTUGAL.

PE'DRO II. (Dom PEDRO DE ALCANTARA), ex-Emperor of Brazil: born Rio Janeiro, 1825, Dec. 2 (reigned 1841–89); died 1891, Dec. 5; son of Pedro I. On his father's abdication, he became sovereign under the regency of Andrada, democratic leader; two years later, under a council of regency; at the age of 16 was crowned emperor; at 18 married Princess Theresa, dau. of Francis I., King of the Sicilies. The Amazon river was made free to all nations 1867. Journeys were made by P. to Europe 1871–2, to the United States, Europe, Pal-

estine, and Egypt 1876–7, and to Europe for his health 1887–8. The sale of slaves was prohibited by decree 1850; a bill for immediate abolition was enacted 1888, May 13, emancipating 600,000 to 700,000 slaves. An attempt on Dom Pedro's life was made 1889, by a Portuguese. 1889, Nov. 15, while at Petropolis, he was informed of the revolution at Rio Janeiro. Returning thither, to his besieged palace, he was notified by the military leader, Gen. da Fonseca, of the decision that he must leave the country; and he accepted the banishment, but, with his family, was hurried on board ship at night by the revolutionists, arriving at Portugal Dec. 7. He remained in Europe, in failing health, dying two years later. A republic was proclaimed in Brazil. The revolution is attributed in part to disaffection of former slaveholders, but more to that of the army, in view of the apprehended substitution of a national guard—the army conspiring with the republican leagues that opposed the centralizing policy of the empire. There were provincial legislatures, but the emperor could veto their acts, had the appointments of governors, judges, and magistrates, and could fill every fourth senatorial vacancy. The council of state had life-tenure, and was made up from the relatives or partizans of the emperor. The heir-apparent, Princess Isabel, and her husband, Count d'Eu (Prince Louise Philippe d'Orleans), were very unpopular. The ex-emperor was a man of noble presence and character, highly cultivated, interested especially in science, and always promoted internal improvements and the education and welfare of all classes in his empire. His wife and two daughters were reported as personally charming, and, like himself, gracious and unaffected, except that Isabel (princess regent during the absence of her father 1887–8) was said to have been imperious in her administration, and her husband was especially disliked by the people.

PEDUNCLE, n. *pĕ-dŭng'kl* [mid. L. *pedun'culus*, a little foot, a foot-stalk—from *pēs* or *pĕdem*, a foot: F. *pédoncule*, a peduncle]: stem or stalk which supports one flower or fruit, or several (see FLOWER): stems by which shells are attached to other objects. PEDUN'CULAR, a. *-kū-lĕr*, pert. to a peduncle, or growing from one. PEDUN'CULATE, a. *-kū-lāt*, or PEDUN'CULATED, a. *-lā-tĕd*, having a peduncle; growing on a peduncle.

PEEBLES, *pē'blz*, JAMES MARTIN, M.A., M.D.: American physician: b. Whittingham, Vt., 1822, March 23. He was graduated from the University of Pennsylvania, was president of the California College of Science four years, professor in the Eclectic Medical College at Cincinnati for three years, and in 1869 was United States consul at Trebizond, Turkey. He has lectured on medical subjects in many countries and has published: *Seers of the Ages* (1875); *Our Homes Hereafter* (1880); *Three Journeys Around the World* (1891); *The Christ*

Question Settled (1897); *Death Defeated* (1900); *The Demonism of the Ages* (1902); *Vaccination—A Curse* (1905); *The Spirit's Pathway* (1906); *Five Journeys Around the World* (1907); etc.

PEEBLES, Mary Louise Parmalee ('Lynde Palmer'): American author: b. Lansingburg, N. Y., 1833, Dec. 10. She was graduated from the Lansingburg Academy in 1850 and in 1862 was married to Augustus A. Peebles. As a writer of juvenile books she has gained some reputation and among her works are: *The Little Captain* (1861); *The Good Fight* (1865); *Drifting and Steering* (1867); *Jeanette's Cisterns* (1882); *Where Honor Leads* (1894); *Helps over Hard Places* (1862); *The Honorable Club* (1867); *One Day's Weaving* (1868); *Archie's Shadow* (1868); *John-Jack* (1869); *Twinkle and Wrinkle* (1889); *Two Blizzards* (1889); *A Question of Honor* (1893); etc.

PEEKSKILL, *pēks'kil*: village in Cortland tp., Westchester co., N. Y.; on the New York Central and Hudson River railroad, and the e. bank of the Hudson river; 43 m. above New York, 17 m. below Newburg. There is a steam-ferry across the river to Caldwell's Landing, and in summer a line of steamers runs to New York. The village occupies an elevated site, and the river scenery is said to be equal to that of the Rhine. The chief industrial establishments are knit-goods factories, foundry, brick works, stone factories, hat factory, and machine-shops. It has Saint Joseph's Home (R.C.) for children, over 1,000 inmates, Saint Anne's Home, and Helping Hand Hospital. The state military camp ground is just north of the village and facing the Hudson. It is the seat of Saint Gabriel's Academy (P. E.), military and business schools, a high school, public elementary schools, and a free library. A fine school stands on 'Drum Hill.' The Field Library has about 7,000 volumes. Peekskill was settled at an early period, was part of the Cortland manor, and was an important point in the revolution. A fire department was organized 1827. The village was incorporated 1839. Pop. (1900) 10,358; (1910) 15,245.

PEEL, n. *pēl* [OF. *pel*, skin; F. *pean*, *peler*, to pare or bark—from L. *pellem*, skin: Dut. *pelle*, skin; *pellen*, to skin, to peel: Dan. *pille*, to pick or strip]: the skin or rind of a fruit; the thin bark of a stick: v. to strip from fruit, etc., the skin, bark, or rind; to pare; to lose the skin or bark; to come off, as the skin. Peel'ing, imp. Peeled, pp. *pēld*. Peeler, n. *pēl'ėr*, one who peels.

PEEL, n. *pēl* [F. *pelle*, a shovel, a peel for an oven—from It. *pala*, a shovel—from L. *pāla*, a shovel, a peel]: a flat wooden shovel for an oven; an instr. used in a printing-office for hanging up printed sheets to dry.

PEEL, v. *pēl* [F. *piller*, to pillage]: in *OE.*, to pillage, another spelling of OE. *pill*, to rob.

PEEL, n. *pēl* [W. *pill*, a stake, a fortress]: in *Scot.*, a small fortress. PEEL-TOWER, one of the towers erected on the Scottish borders for defense. They are square, with turrets at the angles, and the door is sometimes at a height from the ground. The lower story is usually vaulted, and formed a stable for horses, cattle, etc. For an account of these old towers, now mostly in ruin, see *History of Peeblesshire*, by W. Chambers, 1864.

PEEL, *pēl:* small, populous, and thriving seaport town on the w. coast of the Isle of Man. It was formerly called 'Holm,' and was a place of importance in the island. The herring-fishery, the building of small vessels, and the manufacture of nets are carried on. The bay is spacious, and abounds with fish. At its n. extremity are several grotesque and romantic caverns. The s. extremity is formed by Peel Island, on which stand the grand old ruins of Peel Castle and St. German's Cathedral. The castle was formerly the frequent residence of the Earls of Derby, then Lords of the Isle of Man, and is expressly named in the original grant of Henry IV. to the Stanley family. Beneath the cathedral is a strong subterranean dungeon, where many noble persons were in former days imprisoned, including Thomas, Earl of Warwick, in the time of Richard II., and Elinor Cobham, Duchess of Gloucester, who was sentenced to perpetual imprisonment in it 1440, and died within its gloomy recesses. In Sir Walter Scott's *Peveril of the Peak*, constant mention is made of this castle, and indeed it may be said to be the scene of the story. The ruins are yearly visited and admired by thousands of persons. Pop. (1871) 3,513; (1881) 4,360.

PEEL, Sir ROBERT: British statesman: 1788, Feb. 5—1850, July 2; b. near Bury, in Lancashire; son of Sir Robert P. (created baronet 1800), wealthy cotton-spinner, from whom he inherited a great fortune. P. was educated at Harrow, and at Christ-Church, Oxford, where he graduated B.A. 1808, taking a double first-class; and entered the house of commons 1809 as member for Cashel, adopting the strong tory politics of his father. Percival was then prime minister. P. set quietly about the business-work of the house, feeling his way with that steady prudence and persevering diligence that were conspicuous in his character. In 1811 he was appointed under-sec. for the colonies; and 1812–18 he held the office of sec. for Ireland, showing a strong anti Rom.-Catholic spirit (whence the witty Irish gave him the nickname 'Orange-Peel'). This occasioned so ferocious an attack by O'Connell that even the cool and cautious secretary was driven to send the agitator a challenge. The police, however, prevented the duel. 1818–22 P. remained out of office, but not out of parliament, where he sat for the Univ. of Oxford. He now began to acquire reputation as financier and economist. He was still averse to religious or political reform. No member of the Liverpool-Castlereagh cabinet

could have been to appearance more resolute. He even vehemently defended the infamous 'Peterloo Massacre' of 1819. In 1822 he re-entered the ministry as home sec.—Canning shortly afterward becoming foreign sec., on the suicide of Lord Castlereagh. The two worked well together for some time, as P. applied himself to financial matters, especially to the currency; but 'Roman Catholic emancipation' was a question on which Canning was considerably in advance of his brother-secretary, and when Canning was called by the king, after the resignation of Lord Liverpool, to form a sort of whig-tory ministry, P., with the Duke of Wellington and others, withdrew from office. Yet it is singularly characteristic of this most honest and *compromising* statesman that, even when he seceded (1827), his opinions were veering round to the liberal and generous view of the claims of Rom. Catholics; and when the death of Canning, shortly afterward, led to the formation of the Wellington-Peel govt., its great measure—actually introduced by 'Orange-Peel' himself—was the ever-memorable one for the 'relief' of the Rom. Catholics (1829). As home sec., he signalized himself by reorganization of the London police force—since popularly called 'Peelers' and 'Bobbies,' their previous sobriquet being 'Charlies'—from King Charles I., who (1640) extended and improved the police system.

Meanwhile, the Univ. of Oxford had rejected its apostate representative. Then arose the great question of parliamentary reform, which P. firmly but temperately opposed. In 1830 the Wellington-Peel ministry fell, and was succeeded by a whig ministry under Earl Grey, which, 1832, carried the Reform Bill. P. (now Sir Robert P., by the death of his father), when he saw that reform was inevitable, accepted defeat and its results with equanimity. He shrank from factious opposition to the measure, and contented himself with presenting as forcibly as he could the political *per-contra*, seeking by keen and vigilant criticism to retard the too rapid strides of liberalism. He became leader of the 'conservative' opposition. In 1833, when the first 'reformed' parliament assembled, P. took his seat as member for Tamworth, which he represented till the close of his life. On the retirement of the Melbourne ministry, 1834, Nov., he accepted the office of prime minister, but could not give stability to his administration, and was compelled again to give place to Viscount Melbourne 1835, Apr., and resumed his place as leader of the opposition. P.'s conduct in opposition was always patriotic. The whigs, pressed on one side by the new radical party and the Anti-Corn-Law League, and on the other by O'Connell and the Irish repealers, gradually lost ground, and, being narrowly defeated 1841 on a motion of want of confidence, dissolved parliament. The general election that ensued was virtually a contest between Free Trade and Protection. Protection won; and when the new parliament met, a vote of no confi-

dence was carried by a majority of 91. The conservative party, headed by P., now came into office. The great feature of the new govt. was its attitude on the corn-law question. The whigs, while in office, and even after their expulsion, were bent on a fixed but moderate duty on foreign corn; the Anti-Corn-Law League would hear of nothing short of entire repeal; while Sir Robert was in favor of a modification of the sliding scale of duty which had existed since 1828. He introduced and carried (1842), in spite of strong opposition, a measure based on this principle. The deficit in the revenue, which had become quite alarming under the Melbourne administration, next engaged his attention, and led him to bring in a bill (1842) for the imposition of an 'income tax' of 7*d.* in the pound, to be levied for three years. To alleviate the new burden, P. commenced a revision of the general tariff, and either abolished or lowered the duties on several very important articles of commerce, such as drugs, dyewoods, cattle, sheep, pigs, salted meat, butter, eggs, cheese, and lard. He also showed himself resolute in repression of the turbulent malcontents of Ireland. O'Connell (q.v.) was tried for conspiracy, and, though the judgment against him was set aside on appeal to the house of lords, the influence of the 'agitator' was broken. The first half of 1845 was marked by the allowance to Maynooth being increased and changed into a permanent endowment instead of an annual grant, and by the foundation of the Irish unsectarian colleges, and other important measures. But the potato-rot in Ireland during the autumn, followed by a frightful famine, rendered 'cheap corn' a necessity, if millions were not to starve. Cobden and the League redoubled their exertions. Lord John Russell announced the views of the whig party on the crisis, and Peel again yielded. He told his ministerial colleagues that the corn laws were doomed, and that their repeal was inevitable. Some of them refusing to go with him, he resigned; but, after a few days, was recalled, and resumed office. Lord Stanley, the late Lord Derby, seceded, and with Lord George Bentinck, Mr. Disraeli, etc., formed a 'no-surrender' tory party; but the Duke of Wellington, Graham, Aberdeen, Gladstone, and other eminent conservatives, stood by Peel, and the measure for the repeal was carried. He was, however, immediately afterward defeated on an Irish Protection of Life Bill. Not so much on this account, as because he felt that the course which he had pursued had produced a dissolution of the old ties of party, and that he could not expect for some time to find himself at the head of a strong govt., P. retired from office 1846, June, giving place to a whig administration under Lord John Russell, to which he gave an independent but general support as the leader of a middle party rather whig than tory. In the critical times of 1847–8, he was one of the most important props of the govt., whose free-trade principles he had now completely accepted

His ecclesiastical policy also had undergone a remarkable change, and he now frankly supported the whigs in efforts to carry an act for repeal of Jewish disabilities. He was regarded by the working and middle classes generally with grateful respect. An unexpected catastrophe put an end to his career: 1850, June 28, he had spoken with great eloquence in the debate on Lord Palmerston's Greek policy; but on the following day was thrown from his horse in Hyde Park, and was so much injured that he died on the evening of July 2.—He left five sons, the eldest of whom, Sir ROBERT P., and the second, Sir FREDERICK P., have held office as ministers. —ARTHUR WELLESLEY P., the youngest son, graduated at Oxford 1852, was elected to parliament as a liberal, from Warwick, 1865, and became speaker of the house of commons 1884.

PEEP, n. *pēp* [Dut. *piepen*, to chirp, to squeak: OF. *pepier*, to peep, to pule: L. *pipīrĕ*, to peep or cheep like a chicken through the shell—hence to begin to appear: Dan. *at pippe frem*, to shoot or peep forth, as a bud or seed does: an imitative word]: a beginning to ap, ear, as of daylight; a look through a crevice or small opening; a sly look; the cry of a chicken: V. to cry in a small voice, as a chicken; to chirp; to look slily or curiously; to look as through a crevice or from a hiding-place; to begin to appear. PEEP'ING, imp.: PEEPED, pp. *pēpt*. PEEP'ER, n. *-ĕr*, one who peeps. PEEP-HOLE, or PEEPING HOLE, a hole or small opening through which one may look without being discovered. PEEP OF DAY, the first streaks of light in early morning piercing through the shades of night. *Note.*—Skeat prefers the derivation from OF. *piper*, to peep out, to pry; *piper* may be referred to the fowler who whistles or chirps like a bird in order to deceive—thus he *pipes* and *peeps* out at once; hence *peep* implies 'to look out slily,' so as not to be seen.

PEEPUL, *pē'pŭl*, or PIPUL, or PIPPUL, *pĭp'ŭl* (*Ficus religiosa*); known also as the SACRED FIG of India, and in Ceylon as the BO-TREE: species of Fig (q.v.), somewhat resembling the Banyan, but the branches not rooting like those of that tree, and the leaves heart-shaped, with long, attenuated points. The tree is held sacred by the Hindus, because Vishnu is said to have been born under it. It is held sacred by the Buddhists also. It attains great size and age. The juice contains caoutchouc, and is used by women as bandoline. Lac insects feed on this tree, and much lac is obtained from it. The fruit is not much larger than a grape, and, though eatable, is not valued. See BO-TREE.

PEER, v. *pēr* [Norm. F. *parer;* OF. *paroir*, to appear —from L. *parērĕ*, to peep out or appear, as the sun over a mountain: also Low Ger. *piren*, to look with half-shut eyes]: to come just in sight; to appear; to look narrowly; to peep. PEER'ING, imp.: ADJ. prying. PEERED, pp. *pērd. Note.*—PEER here has a double origin assigned to it, but the confusion resulting therefrom cannot now be unravelled; in the sense 'to come just in sight,' *peer* may be nothing more than an abbreviation of 'appear.'

PEER, n. *pēr* [OF. *per* or *peer;* F. *pair*, a peer, a match—from L. *par*, equal]: a match; an equal; one of the same social rank; a nobleman; a member of the house of lords; general name applied to the titled nobility of Great Britain and Ireland, indicating their equality of rank. The peerage includes the various degrees of Baron, Viscount, Earl, Marquis, and Duke. The peers of England, of Great Britain, of the United Kingdom, and certain representative peers of Scotland and Ireland, together with certain of the bishops and archbishops, who are called lords spiritual, constitute the house of lords. The dignity of the peerage is hereditary, but in early times was territorial. Life-peerages seem at one time to have been known in England; but in 1856 Sir James Parke, having been created by Queen Victoria Baron Wensleydale 'for and during the term of his natural life,' the house of lords, on the report of a committee of privileges, held that he was not entitled to sit and vote in parliament. Ladies may be peeresses in their own right either by creation or by inheritance: the wives of peers also are styled peeresses. For notices of each order, and of the whole body, see NOBILITY: PARLIAMENT: DUKE: MARQUIS: EARL: VISCOUNT: BARON.

A certain limited number of the French nobility were styled Peers of France. PEER'AGE, n. *-āj*, the body of peers; the rank or dignity of a peer. PEER'ESS, n. fem. *-ĕs*, the wife of a peer; a noble lady. PEERLESS, a. *-lĕs*, without an equal. PEER'LESSLY, ad. *-lĭ*. PEER'LESSNESS, n. *-nĕs*, the state of being peerless.

PEEVISH, a. *pēv'ĭsh* [prov. Dan. *piæve*, to whimper, to cry like a child: Gael. *piob*, to pipe, to squeak: probably of onomatopoetic origin]: cross or ill-tempered; fretful; apt to mutter and complain; hard to please; in *OE.*, childish; thoughtless; froward. PEEV'ISHLY, ad. *-lĭ*. PEEV'ISHNESS, n. *-nĕs*, the quality of being peevish; sourness of temper; fretfulness.—SYN. of 'peevish': querulous; petulant; cross; discontented; waspish; ill-grained; ill-tempered; fretful; ill-natured; testy; spleeny; irritable; captious; irascible; perverse; morose.

PEEWIT, or PEWIT, n. *pē-wĭt'* [Scot. *pee-weip;* Dut. *kievit*—a word imitative of its cry]: the lapwing or tufted plover: see LAPWING: see also PEWEE.

PEG, n. *pĕg* [Dan. *pukke*, to stamp, to pound: comp. L. *pango*, I fix]: small, pointed chip of wood used as a pin or nail; one of the movable pins of an instrument, by which the strings are strained. *Shoe-pegs* are small, square-pointed strips of wood (chiefly maple) used to connect the parts of the sole and upper leather without sewing—an Amer. invention, introduced throughout Europe: see SHOE. PEG, v. to fasten with pegs. PEG'GING, imp. PEGGED, pp. *pĕgd:* ADJ. fastened with pegs. PEG'GER, n. *-ĕr*, one who pegs. TO TAKE A PEG LOWER, to depress or sink: see PEG 2. PEGGED BOOTS, boots with wooden or iron pegs fastening the soles, instead of stitching. PEG TOP, a child's plaything for spinning, made of wood. TO PEG AWAY, to continue at with small but never-ceasing efforts.

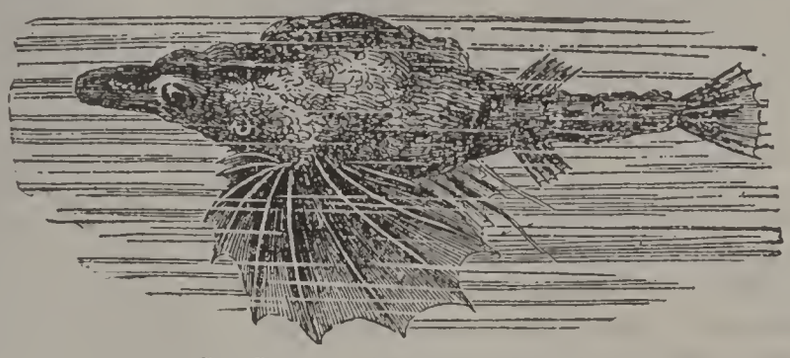
PEG [see PEG 1]: a slang term meaning 'a glass of brandy and soda-water,' derived from the old liquor-tankards, which were pegged up or down with pegs, to indicate the quantity of liquor contained, more or less; hence, *to take down a peg* is to lower the arrogance or conceit of a person in some significant way. *Note.*—The origin of this is referred also to the lowering or raising of a ship's colors by pegs for the retaining-line.

PEGANUM, *pē'găn-ŭm:* genus of plants of nat. order *Zygophyllaceæ*, of which the only known species is *P. harmala*, half-shrubby plant with linear, smooth, almost bipinnatifid leaves and solitary, white, axillary flowers, native of the Levant and n. India, sometimes cultivated in gardens under the name SYRIAN RUE. The seeds are narcotic, and Emperor Solyman is said to have kept himself intoxicated by eating them. They were used formerly in medicine in Europe, and still are in the East. The Turks use them as a spice, also for dyeing red. The plant is believed to be the *Harmala* of the Greeks, mentioned by Dioscorides as one of the kinds of *Peganon*.

PEGASSE, or PACASSE (*Bos pegasus*): species of ox, native of the interior of w. Africa. The head is short and thick; the forehead wide; the horns long, extending laterally from the frontal ridge, then turning downward, and again upward; the ears very large and pendulous; the neck maned; the tail entirely covered with long hair; the legs long. Little is yet known of this curious species of a most important tribe.

PEG'ASUS: genus of fishes, constituting the family *Pegasidæ*, of order *Lophobranchii* (q.v.). The species are few; they are small fishes, natives of the Indian seas, interesting from their peculiar form and appearance. The breast is greatly expanded, much broader than high, the gill-openings in the sides; the pectoral fins are extremely large and strong; a long snout projects before the eyes, and the mouth is under and at the base of it; the body is surrounded by three knobbed or spinous rings.

One species (*P. draco*) is called SEA DRAGON, another (*P. volans*) is popularly known as PEGASUS.



Sea Dragon (*Pegasus draco*).

PEGASUS, n. *pĕg′ă-sŭs*, in Greek Mythology: a winged horse which arose with Chrysaor from the blood of the Gorgon Medusa, when she was slain by Perseus; said to have been named from having made his appearance first beside the springs (*pēgai*) of Oceanus. He afterward ascended to heaven, and was believed to carry the thunder and lightning of Zeus. According to later authors, however, he was the horse of Eos. The myth concerning P. is interwoven with that of the victory of Bellerophon over Chimera. Bellerophon had in vain sought to catch P. for his combat with this monster; but was advised by the seer Polyidos of Corinth to sleep in the temple of Minerva, and the goddess, appearing to him in his sleep, gave him a golden bridle and certain instructions, upon which he acted, and made use of P in his combat with the Chimera, the Amazons, and the Solymi. P. is spoken of also in modern times as the horse of the Muses, which, however, he was not. The ancient legend on this subject is, that the nine Muses and the nine daughters of Pieros engaged in a competition in singing by Helicon; and everything was motionless to hear their song, save Helicon, which rose ever higher and higher in its delight, when P. put a stop to this with a kick of his hoof, and from his hoof-print arose Hippocrene, the inspiring spring of the Muses. But that P. is the horse of the Muses is entirely a modern idea, being found first in the *Orlando Innamorato* of Boiardo.—An anc. constellation was named P. from this mythical horse.

PEGLI, *pāl′yē:* town in the province of Genoa, Italy; on the shore of the Mediterranean Sea, 6 m. w. from the city of Genoa. Large quantities of oranges are grown, and the place is a famous resort of travellers. Its almost perfect climate and the beauty of its scenery combine to render it attractive. There are several large hotels and bathing establishments. Pop. about 5,000.

PEGMATITE, n. *pĕg′mă-tīt* [Gr. *pēgma*, anything compacted or congealed]: granite composed of quartz and felspar, containing sometimes flakes of silvery-white mica.

PEGU, *pē-gō′*: division in Brit. Burmah, till lately the central division, between Aracan in the n. and Tenasserim in the s.; comprising the valley of the lower Irrawaddy and the coast. In this sense it had (1872) 26,979 sq. m.; pop. 1,662,058. At the census of 1881 it had been severed into two divisions, P. and Irrawaddy, with minor readjustments. P., containing the districts of Rangoon, Hanthawadi, Tharrawadi, and Prome, had (1891) 9,299 sq. m.; pop. 1,441,220. The new division, Irrawaddy, had 16,805 sq. m., distributed into the districts of Thunkhwa, Bassein, Henzada, and Thayetmyo; pop. 1,487,260. Of the joint pop. of the two divisions, about 900,000 are true Burmans; but there is a sprinkling of Karens, who live in the wild and hilly districts, Taleins or Peguers, Shans, Khyengs, Yabaings, Indians, Chinese, and some other races.

The principal river of P. is the Irrawaddy (q.v.). In Mar., the river begins to rise, and gradually increases till its waters are 40 ft. above their lowest level. They rapidly subside in Oct., when the rains cease, and the n.e. monsoon sets in. Other rivers are the Hlaing or Rangoon, the Pegu, the Sittaung, and the Bhileng. P. was annexed to Brit. India at the close of the Burman war of 1852, since which time slavery has ceased, schools have been established, and various public works undertaken. Rice and teak timber are principal exports. A flotilla of steamers keeps up communication between Rangoon (q.v.), the principal port, and the chief stations on the Irrawaddy, conveying troops, stores, passengers, and mails from place to place.

P. is the name also of the n.e. 'township' of the Rangoon dist., containing the headquarters town of P. The n.w. portion is mountainous and forest-clad; southward the hills sink toward the fertile level land, covered with rice-fields. The Pegu river, 180 m. long, intersects the township, and finally joins the Rangoon river.

P. town, on the river, now a small place of about 5,000 inhabitants, seems, by the accounts of European travellers in the 16th c., to have been of great size and magnificence, strongly fortified. The anc. town was founded A.D. 573; and its sovereigns reigned over the Irrawaddy, conquered Ava, and successfully invaded Siam and Aracan.

PEH′LEVI: see PAHLAVI.

PEI-HO, *pā-hō′*: river of China, rising on the confines of Tartary, traversing the n. part of the province of Chih-le (q.v.) or Pechih-le, and falling into the Gulf of Pechih-le about 38° 30′ n. lat. The attack on the escort of the British and French ambassadors, while ascending the Pei-ho to Peking 1859, June, led to the war with China 1860: see CHINA.

PEINE FORTE ET DURE, *pān fōrt ā dür* [Fr. strong and hard pain] : species of torture formerly applied by the law of England to those who, on being arraigned for felony, refused to plead, and stood mute, or who peremptorily challenged more than 20 jurors, which was considered a contumacy equivalent to standing mute. In the beginning of the 13th c., this penalty seems to have consisted merely in a severe imprisonment with low diet, persisted in till the contumacy was overcome. But by the reign of Henry IV., it had become the practice to load the offender with weights, and thus press him to death ; and till nearly the middle of the 18th c., pressing to death was the regular and lawful mode of punishing persons who stood mute on their arraignment for felony. The motive which induced an accused party, in any case, to submit to this penalty rather than to plead, was probably to escape the Attainder (q.v.) which would have resulted from conviction for felony. During the 15th, 16th, 17th, and even the 18th c., various cases are recorded of infliction of this punishment. Latterly, a practice prevailed which had no sanction from the law, of first trying the effect of tying the thumbs tightly together with whipcord, that the pain might induce the offender to plead. Among instances of the infliction of the *peine forte et dure* are the following : Juliana Quick, 1442, charged with high treason in speaking contemptuously of Henry VI., was pressed to death. Anthony Arrowsmith, 1598, was pressed to death (Surtees's *History of Durham*, III. 271). Walter Calverly of Calverly, Yorkshire, arraigned at the York assizes 1605, for murdering his two children and stabbing his wife, was pressed to death in the castle by a large iron weight placed on his breast (Stow's *Chronicle*). Major Strangways suffered death in a similar way in Newgate 1657, for refusing to plead when charged with the murder of his brother-in-law. In 1720 a man named Phillips was pressed in Newgate for a considerable time, till he was released on his submission ; and the same is recorded in the following year of Nathanie. Hawes, who lay under a weight of 250 lbs. for seven minutes. As late as 1741, a person is said to have been pressed to death at the Cambridge assizes, the tying of his thumbs having been first tried without effect. The statute 12 Geo. III. c. 20 virtually abolished the *peine forte et dure*, by enacting that any person who shall stand mute when arraigned for felony or piracy shall be convicted, and have the same judgment and execution awarded against him as if he had been convicted by verdict or confession.

PEIPUS, *pā'ē-pôs*, LAKE: in n.w. Russia, surrounded by the govt. of St. Petersburg and the provinces of Esthonia and Livonia. On the s.e. it is connected with Lake Pskoff by a strait 16 m. in length and 1½ to 4½ m. broad. The length of both lakes is 87 m., greatest breadth about 40, depth 14 to 49 ft. Lake Pskoff receives the waters of the river Velekaia, and Lake P. is supplied by Lake Pskoff, and by the Embach, from the w., and other rivers. The waters of the lower lake are carried to the Gulf of Finland by the Narova. The lakes are studded with picturesque islands.

PEIRAMETER, n. *pī-răm'ĕ-tĕr* [Gr. *peira*, trial, attempt; *metron*, a measure]: an instrument for ascertaining the amount of resistance to carriage-wheels on differently prepared roads.

PEIRCE, *pērss*, BENJAMIN, LL.D.: 1809, Apr. 4—1880, Oct. 6; b. Salem, Mass.; d. Cambridge: mathematician. He was graduated at Harvard Coll. 1829; appointed prof. of astronomy and mathematics 1842: this chair he held till his death. P. was frequently called to assist in matters connected with the coast survey, and directed the longitude determinations of that service 1852–67: he was supt. of the survey 1867–74. Under his administration, the survey was extended to a great geodetic system, stretching from ocean to ocean, thus laying the foundations for a general map of the country (see COAST AND GEODETIC SURVEY). P. took personal charge of the solar-eclipse expedition to Sicily 1870, Dec. After his retirement from the superintendency, he was retained as consulting geometer, in general supervision of the scientific part of the work. He was consulting astronomer to the *American Ephemeris and Nautical Almanac* 1849–67. P.'s eminence as a mathematician was established by his discussion of Leverrier's discovery of Neptune, in which he showed that, though the calculations of the French astronomer were in the highest degree accurate and worthy of all honor, the discovery of Neptune was a happy accident, because two very different possible explanations of the perturbations of Uranus existed. His next research was with regard to the rings of Saturn. Among his later mathematical researches was a laborious and exact calculation of the occultations of the Pleiades. Mainly to P.'s efforts is due the establishment of the present Harvard observatory. He was a member of the Amer. Acad. of Arts and Sciences, the Amer. Philosophical Soc., associate of the London Royal Astronomical Soc., and was one of the corporate members of the National Acad. of Sciences. Among his published writings are: *Elementary Treatise on Spherical Trigonometry* (1835); *Sound* (1836); *Plane and Solid Geometry* (1837); *Algebra* (1837); *Curves, Functions, and Forces* (2 vols. 1841-46). All the foregoing works he entitled 'elementary treatises.' They were followed by *Analytic Mechanics* (1855); *Linear Associative Algebra* (1870); and *Ideality in the Physical Sciences* (1881).

PEIRCE, *pērs*, JAMES MILLS: b. Cambridge, Mass., 1834, May 1; d. 1906; son of Benjamin Peirce. He graduated from Harvard 1853; was tutor in that institution for several years; became assistant professor of matematics, 1861, professor 1867, and professor of mathematics and astronomy 1885. He was a member of various scientific societies; contributed to periodicals; published *A Text-Book of Analytic Geometry* (1857), *Mathematical Tables Chiefly to Four Figures* (1879), and other works; and edited his father's book on *Ideality in the Physical Sciences* (1881).

PEISHWA, *pāsh'wâ* or *pĭsh'wâ* (Minister): title of the personage third in rank and authority at the court of the Mahratta Maharajahs of Satara, there being only the *Priti-nidhi* (Delegate of the Rajah) between him and his sovereign. However, during the weak reigns of Sevajee's descendants, the minister increased in importance, till, at the commencement of the 18th c., BALAJEE BISWANATH, then Peishwa, made himself virtually ruler of the Mahrattas.

PEISISTRATOS, *pī-sĭs'tra-tŭs* [Lat. *Pisistratus*): famous 'tyrant' of Athens: b. toward the close of B.C. 7th c.—certainly not later than B.C. 612; d. 527; belonging to a family of Attica which claimed descent from Pylian Nestor. His father's name was Hippocrates, and through his mother he was related to the great lawgiver Solon, between whom and Peisistratos intimate friendship long existed. He received an excellent education; and the charm of his manners, as well as the generosity of his spirit, was so great that (according to Solon), had he not been ambitious, he would have been the best of Athenians; but his passion for sovereign power led him to a policy of artifice and dissimulation. At first, Peisistratos co-operated with his kinsman Solon, and in the war against the Megarians acquired military distinction; but afterward, when probably his ambitious views had become more matured, he came forward as the leader of one of the three parties into which Attica was divided. These were: the *pediœi* (party of the Plain), landed proprietors; the *Parali* (party of the Seaboard), wealthy merchant classes; and the *Diacrii* (party of the Highlands), chiefly a laboring population, jealous of the rich and eager for equality of political privileges. To the last of these Peisistratos attached himself; but he assiduously cultivated the good-will of all the poorer citizens, toward whom he acted as a benefactor. At last, Peisistratos took a decided step. Driving into the market-place of Athens one day, and exhibiting certain self-inflicted wounds, he called on the people to protect him against his and their enemies, alleging that he had been attacked for his patriotism. Solon, who was present, accused him of hypocrisy; but the crowd were, according to Plutarch, ready to take up arms for their favorite; and a general assembly of the citizens

being summoned, Ariston, one of P.'s partizans, proposed to allow him a body-guard of 50 men. The measure was carried, in spite of the strenuous opposition of Solon. Gradually P. increased the number, and B.C. 560, when he felt himself strong enough, seized the Acropolis. The citizens, in general, seem to have tacitly sanctioned this high-handed act. They were weary of the anarchic broils of the different factions, and probably glad to see their champion and favorite usurp supreme authority. Megacles and the Alcmæonids—heads of the rich aristocratic party—immediately fled from the city. Solon, who loved neither oligarchic arrogance nor military despotism, but was a thorough constitutionalist, tried, but in vain, to rouse the Athenians against Peisistratos. P., who was not at all vindictive in his disposition, did not attempt to molest Solon; he even maintained the legislation of the latter almost intact, and distinguished himself chiefly by vigor of administration. He did not exercise his first 'tyranny' long. The *Pediæi* and the *Parali* rallied under Lycurgus and Megacles, united their forces, and overthrew the usurper, who was forced into exile. But the coalition of the two factions was soon broken up. Megacles hereupon made overtures to P., inviting him to resume his tyranny, which he did; but a family quarrel with Megacles induced the latter to ally himself again with Lycurgus, and P. was driven from Attica. He retired to Eubœa, where he remained ten years, ever keeping an eye, however, on Athens, and making preparations for forcible return. How P. managed to acquire so much influence, while only a banished man, is not evident; but certain it is that many Greek cities, particularly Thebes and Argos, placed full confidence in him, and finally supplied him abundantly with money and troops. P. at length sailed from Eubœa, landed in Attica at Marathon, and marched on the capital. His partizans hurried to swell his ranks. At Pallene, he encountered his opponents, and completely defeated them, but used his victory with admirable moderation. When he entered the city, no further resistance was made, and he at once resumed the sovereignty. The date of this event, as of most others in the life of P., is very uncertain; probably B.C. 543 would be a conjecture not far wrong. He lived 16 years afterward in undisturbed possession of power, and transmitted his supremacy to his sons, Hippias and Hipparchus, known as the *Peisistratidæ*. His rule was mild and beneficent. Although the precautionary measures that he adopted to establish his authority involved at first a certain resolute and stringent policy (e.g., seizure of the children of his leading opponents, and detaining them as hostages), yet no sooner had he placed himself out of danger than he began to display that wonderful tact, moderation, kindliness, and sympathetic appreciation of the wishes of the Athenians, that have won him the praise and esteem of later ages, in spite of his usurpation. He firmly, but not harshly, enforced obedience to the laws

of Solon; emptied the city of its poorest citizens, and made them agriculturists, supplying such as had no resources with cattle and seed; secured provision for old and disabled soldiers; bestowed great care on the celebration of the religious festivals of the Atticans, and even introduced some important changes; encouraged literature more than any Athenian had ever done before —it is to P., or to the poets, scholars, and priests that he gathered about him, that we owe, e.g., the first complete edition of Homer (q.v.); and, like his more brilliant successor in the following century, Pericles, he adorned Athens with many beautiful buildings, such as the Lyceum, a temple to the Pythian Apollo, another to Olympian Zeus, etc.

PEKAN, n. *pĕk'ăn* [F. *pékan*], or WOOD-SHOCK (*Martes Canadensis*): species of Marten (q.v.), very nearly allied to the sable; native of n. parts of N. America. It is twice the size of the pine marten, and is generally of grayish-brown color; the legs, tail, and back of the neck marked with darker brown. The fur, though not so valuable as sable, nor even as that of the pine marten, is useful; and large quantities are sent to market. The P. lives in burrows which it excavates in the banks of rivers, and feeds chiefly on fish and other aquatic animals.

PEKIN, *pē'kĭn:* city, cap. of Tazewell co., Ill.; on the Chicago Santa Fé and California, the Jacksonville Southeastern, the Cleveland Cincinnati Chicago and St. Louis, the Peoria and Pekin Union, and the Peoria Decatur and Evansville railroads, and on the Illinois river; 10 m. from Peoria, about 160 m. s.w. of Chicago. There are 12 churches; several excellent schools; 2 daily and 4 weekly newspapers, one of the latter printed in German; 2 national banks (cap. $200,000) and a private bank. The manufactures are extensive, including flour, organs, wagons, and agricultural implements. Coal is mined in the immediate vicinity, and there are two iron foundries. The surrounding country is very productive, and the city is a shipping point for large quantities of grain and pork. There is abundant supply of water, the streets are lighted with gas, and a public park is maintained. The first white settlement was made 1831, and articles of incorporation were secured 1849. Pop. (1890) 6,347; (1900) 8,420; (1910) 9,897.

PEKING, *pē-kĭng'*, or PEKIN, *pē-kĭn'* (i.e., Northern Capital): city, cap. of Chinese empire since 1421; on a sandy plain, about 13 m. n.w. of the Pei-ho; lat. 39° 54′ 13″ n., long. 116° 28′ 54″ e.; in the n. province of Chih-le, nearly 100 m. from the sea, about 60 m. from the great Chinese wall. Pop. estimated about 1,000,000; circuit of the walls, according to the latest measurements, 20 m. These walls are of earth, with outer casing of brick, having embrasures for musketry or ordnance every 50 ft. Those of the Tartar City have an average height of 50, but in some places 61, ft. In thickness they vary from 57 to 22 ft. The walls of the Chinese City are only 30 ft. high, and 15 to 25 wide. The top, to which horsemen can ascend by a ramp or sloping way, is paved with stone. At intervals of 60 yards are square towers or buttresses, projecting outward from the walls 50 or 60 ft. Of the 16 gates which give access to the city from the surrounding country, 9 belong to the Northern or Tartar City, and 7 to the Southern or Chinese City. Over each gate is a watch-tower nine stories in height, loop-holed for cannon.

The city of P. is divided into two parts, separated by a wall with three gates. These two sections form respectively the Northern, Interior, or Tartar City, called *Nei-tching* ('within the walls'); and the Southern, Exterior, or Chinese City, called *Wai-tching* ('without the walls'). 'Tching' or 'ching,' it may be remarked, means both city and wall. Northern City and Southern City are the correct terms. The latter was added to the more ancient Northern City, and was originally designed to encircle it; hence it was called the Exterior City. It was also intended to reserve the Northern City for the Tartars, and the Southern City for the Chinese, as the names still imply; but, in fact, the Tartar City contains as many Chinese as Tartars; and it is not surrounded by the so-called Chinese City, which latter has been added on only the s. side.

1. *Nei-tching, or the Northern City*, has three distinct divisions or inclosures—viz., Kin-tching, or the Prohibited City; the Hwang-tching, or Imperial City; and the General City. The first—the innermost or central block—is surrounded by a red brick wall about two m. in circumference, which shuts in the palaces, pleasure-grounds, and temples of the sacred city. Here live the emperor and his family, the ladies of the court, and the attendant eunuchs. The palace proper consists of four large and two small buildings; the larger called the Tching-kung, or '*the* Palace,' the Tung-kung, Si-kung, and Kin-luan-teen. The smaller buildings are allotted to the dowager-empress and suite; they are called the Ning-shou-kung and the Keen-tsing-kung, or 'Palace of Earth's Repose.' Other notable buildings of the Prohibited City are Fung-seen-teen, 'Temple of Imperial Ancestors;' Tching-hwang-meaou, 'Guardian Temple of the City;' Nan-heun-teen, 'Hall of Portraits of the Chinese

Emperors and Sages;' and Wan-yuen Ko, 'Hall of the Literary Abyss,' i.e., the Imperial Library. It contains also the offices of the cabinet, in which the members hold their sessions, the imperial treasury, the court of controllers for regulation of receipts and expenses of the court, etc.—The Imperial City is built around this central block, and contains the palaces of the princes, temples, some of the govt. offices, and spacious pleasure-grounds, with beautiful artificial lakes. From Woo-ying-teen, the imperial printing-office, the *Imperial* or *Pe-king Gazette* is issued daily for all govt. officials throughout the empire. This is the only native publication in China approaching to a newspaper, and is named *King Paou*, or 'Great Report.' It is not merely a report for official information, but forms the basis of the national annals, and is compiled from the daily records of the supreme council. Besides the daily edition, there is one published every two days, which is sold to the public, and from which are withheld secret decrees and reports. The journal itself is a miserable production even for China, and consists of 15 to 20 pages not so large as common note-paper.—The General City—the third division or inclosure—lies between the Imperial City and the outside walls; it is more densely populated than either of the preceding divisions, and contains the most important of the public offices, including the six supreme tribunals or boards—the Le-fan-yuen, or Office of Foreign Affairs; Too-cha-yuen, or Imperial Censorate, etc.; Han-lin-yuen, or Grand National College; the Great Medical College; the Observatory; the Examination Hall, with—it is said—ten thousand cells for the candidates who assemble to compete for public offices; and the British, French, Russian, and U. S. legations. There are also the Lama temple, founded 1725–30 to conciliate the Tibetan priesthood; the temple of Confucius, in which the emperor solemnly 'worships' the great sage once a year; and the Mohammedan mosque. The British minister resides in the Leang-kung-foo, or the Palace of Leang, a gorgeous building, consisting of four or five large halls, and covering about five acres of land. The principal streets of the General City—140 to 200 ft. wide, and unpaved—are continuous lines of shops painted red, blue, and green, decorated with staring signs, and resplendent with Chinese characters highly gilt. By day and by night, by the light of the sun or of torches and paper lanterns, the roar of these great thoroughfares is incessant—shopkeepers, pedlers, mountebanks, quack-doctors, passengers on foot or on horseback, contributing to the general hubbub. The minor streets and lanes, where the houses of the populace are mingled with public offices, temples, stores, and manufactories, are not pleasant places; their general characteristics being an 'insupportable odor,' and one-storied brick houses with gray roofs. There is 'Fetid Hide Street,' 'Dog's-tooth Street,' 'Dog's-tail Street,

'Barbarian Street,' and many others with names equally unenviting.

2. *Wai-tcheng, or the Southern City*, the second great division of P., contains most of the mercantile population of the capital, but does not present many features of interest to the traveller. Teen-Tan, or the Temple to Heaven, and Tee-Tan, or the Temple to Earth, with their grounds, occupy a considerable space. The latter is considered a sort of temple of agriculture, and its grounds are the scene of the well-known ceremony in which the emperor, assisted by members of the board of rites, opens the ploughing season in China at the vernal equinox. The theatres and places of public amusement likewise are in the Southern or Chinese City: also the Golden Fish-ponds and the execution-ground.

Outside the city are unwalled suburbs, as around every walled town in China. These are of considerable extent, but straggling, and contain principally an agricultural population, the land being everywhere in cultivation, producing chiefly maize and millet, as it is not so suitable for the staple products of rice and wheat. The land is poorly watered, but well timbered, which gives a pleasing aspect to the landscape; and, when viewed toward the range of mountains extending from the w. of P. to the n.e., presents a picturesque panorama. About 8 m. n.w. of P. are the famous Yuen-ming-yuen (literally, 'Round and Splendid Gardens') palaces, sacked and destroyed by the allies 1860, Oct. These were 30 in number, surrounded by every variety of hill and dale, woodland and lawn, interspersed with canals, pools, rivulets, and lakes, with numerous temples and pagodas containing statues of men and gods in gold, silver, and bronze. Here had been heaped up for centuries all the movable riches and presents of the emperors of China, among which were found many sent by the English embassies. At the approach of the allies, Hien-fung fled in haste; and when Lord Elgin learned that it was in those grounds that the British and French prisoners, captured by treachery, had been tortured, he gave the order to sack and destroy this favorite residence of the emperor, 'as it could not fail to be a blow to his pride as well as his feelings; and it became a solemn act of retribution.' The palaces were cleared of every valuable, and their walls destroyed by fire.

P. has thus been rendered memorable by this march of the British and French forces (1860) to the walls of the city, on which the British and French flags were raised. The provisions of the treaty of Tien-tsin 1858 (see CHINESE EMPIRE) were ratified and supplemented by the *Convention of P.*, signed in the English and French languages at P. 1860, Oct. 24. The most important article of this convention is that which allows the residence of a British envoy at P., a privilege formerly possessed by Russia alone. Great benefits have resulted to both governments from this step. The same privi-

lege has been granted to the French and United States governments. Foreigners of all nations are allowed to visit, but not to trade, within the precincts of the city.

Peking is a very ancient city. Centuries before the Christian era, it was capital of the kingdom of *Yen;* but when this kingdom was overthrown by the *Tsin* dynasty B.C. 222, the seat of govt. was removed elsewhere. About A.D. 738, it, again, became capital of the *Kitan* dynasty. In 1215 it was captured by Genghis Khan; and 1264 Kûblai Khan (whom readers of Coleridge will remember) fixed his residence here. *Cambaluc* or *Cambalu* (City of the Khan) was the name under the Mongols given to the new or Northern City established here. The native emperors, however, who succeeded the Mongol dynasty, removed the court to Nanking, which was reckoned the chief city of the empire till Yung Lo, third emperor of the Ming dynasty, 1421, once more made Peking the imperial residence. In 1900 June 20—Aug. 14, during the Boxer uprising, the foreign delegations in Peking were besieged, and their members with other foreigners were only saved from massacre by a joint force of troops sent by the Powers. The siege in Peking in 1900 was the outgrowth of the Boxer uprising. The latter was a secret society formed, at first, for the suppression of lawlessness. This aim was altered later and the Boxers banded themselves together anew for the extermination of foreigners and the prevention of foreign intercourse with China. In 1898 the empress dowager, Tse Hi, by a *coup d'état* made herself the ruling power, holding the young reform emperor, Kwang Hsü (d. 1908, Nov.) a semi-prisoner. The Dowager represented the reactionary forces of the Empire. The rise of the Boxers against foreigners in 1899–1900 was due to the encouragement of the Empress Dowager and her coterie who opposed the reforms of Kwang Hsü.

The Boxer movement was not a great anti-religious uprising, nor was it an anti-missionary crusade. It was distinctly anti-foreign, and this, irrespective of race, color, religion or nationality. The Boxers murdered European merchants, killed foreign engineers, massacred British and American missionaries, one and all, for the same reason, namely, that they were foreigners. Native Christians fell under their ban and were put to death by thousands because they were representatives of the new forces that had instituted the reforms of the young Emperor. The feeling against anything and everything foreign ran so high in the city of Peking that the native shops were destroyed for selling American cottons or Japanese lamps.

All this time the rumor was spreading that the Empress was lending her aid to the Boxers in the hope that, instituting a reign of terror, all foreigners might be driven out of China. Many Chinese saw in this only disaster to the government, but even members of the Tsung Li Yamen (Foreign Office) were put to death

when they opposed this insane policy of exterminating foreigners. This fact, together with documents found in Peking, shows beyond question the complicity of the Chinese Government in bombarding the legations. In 1900, May, seven of the eleven legations, fearing mob violence, secured from their respective navies detachments of marines as legation guards. This force was less than 500, but in addition, there were probably 450 foreigners in Peking. By June the anti-foreign element was in possession of both the executive and military arms of the Empire. The end of the first week found a critical state of affairs in Peking. The telegraph had been cut, the railroad to the port city of Tientsin had been rendered useless, and all foreigners in and near Peking had fled from their homes and banded together in several places for self-protection. During this time dangers thickened, foreign property was looted and burned, while thousands of native Christians and foreign sympathizers fell by the sword. Matters reached a crisis on June 19 when the Chinese Government sent word to the legations that all the foreign diplomats and their attachés should leave Peking within 24 hours. This was the beginning of the siege proper. The morning of the 20th, Baron Von Kettler, the German minister, while on his way to the foreign office to expostulate against this treatments of the representatives of friendly powers, was shot down on the streets of Peking by imperial soldiers. The Chancellor of the Japanese legation had met a similar fate a few days before.

Upon the news of the murder of Baron Von Kettler, the other ministers and their nationals who were preparing to leave the city decided that it would be impossible to make a journey of nearly 100 miles through hostile territory infested by bands of Boxers and Chinese troops. Certain massacre would have followed had the foreigners left the walls of Peking and exposed themselves to the attacks of the Chinese in the open country. Rather than take such a perilous journey, fearing the fate of Baron Von Kettler, the foreigners massed together in the British Legation, and the legations immediately surrounding it, and decided to try to hold out until relief should arrive. Fortunately, the legations in Peking, after Oriental style, were surrounded by strong walls. Withdrawing within this enclosure, supplying themselves with what food they could procure, they fought only on the defensive. In round numbers, there were 900 foreigners, including marines, in the legations. Of these, 228 were women and children. In addition there were the 3,000 native Christians. Besides those in the legations, 41 marines, 13 French fathers, 20 sisters and 3,200 natives were besieged in the North Cathedral. The foresight of Bishop Favier had laid in food for his refugees. Sir Claude MeDonald, British Minister, was commander-in-chief of the legation forces. This little band for 56 days held at bay an unknown

multitude of Chinese soldiers. Firing was almost continuous upon the legations for 28 days, when a semi-truce followed until about 20 days before the relief forces arrived. The first efforts of the Chinese was to set fire to the legations. Dangerous conflagrations were fought day and night until the legations themselves stood in the midst of charred ruins. The great Hanlin library was fired by the Chinese in an effort to burn the British legation. The besieged had only, beside their rifles, one cannon throwing a one-pound shell, a Nordenfeldt, a Colt, some more rapid-fire guns and an old English cannon of 1860.

As many as 400 shells and solid balls were thrown at the legations in a single day. Forty-three days of the siege were filled with the hail of bullets and the crash of shells. The Chinese soldiers indulged by night in furious attacks of rifle fire. Only the bad marksmanship of the assailants prevented the annihilation of the besieged. Yet every hour witnessed miraculous escapes. From the beginning the siege was well organized. In addition to the military, there were the following committees: (1) general management, (2) fortifications, (3) food supply, (4) labor, (5) fire, (6) confiscated goods, (7) on care of the horses, (8) sanitary and hospital. Constant effort was made by native messengers to reach the port with news. Out of 20 messengers dispatched, 17 were killed—three reached Tientsin. The besieged subsisted on rice, wheat, horses and mules. In many cases the native besieged became reduced in rations until they ate dogs. Fortunately the wells of water held out. The heat was often great. Smallpox, scarlet fever, diphtheria, and dysentery especially, broke out in the native camp, but were held in check. Only one foreign infant out of seven survived. Marines and civilians vied with each other in the display of bravery. The mortality among officers was large. Capt. Thomann (Austrian), Capt. Ando (Japanese), Capt. Strouts (British), Capt. La Bruce (French), Lieut. Henry (French), Lieut. Paolini (Italian), were killed. Two British, two American, three Austrian, one Russian, one French, and two Italian officers were wounded. The Belgian and American captain-surgeons were wounded, and the Japanese surgeon was killed. Among the defenders almost 50 per cent. were killed or wounded. At the cathedral 400 natives and foreigners were killed. The American marines held a perilous position on the city wall, reinforced by British and Russians. Seventeen languages were represented among the besieged.

Most of the French, the Austrian, Italian, Dutch and Belgian legations were entirely destroyed. All the others, while held, were almost demolished by the terrific bombardment. On June 10 an effort had been made at Tientsin by 2,000 internationals under Admiral Seymour (Br.) and Capt. McCalla (U. S.) to reach Peking.

After getting half way and enduring terrible hardships this force had to retreat to Tientsin. The latter place itself was shelled for 30 days. On August 4, about 20,000 allies under Generals Gaselee (British), Chaffee (U. S.), Fukushima (Japanese), Linievitch and Vassiclevsky (Russian), and Frey (French) left Tientsin and after a terrible march of ten days reached Peking. Every mile of the way they drove the Chinese forces before them.

The allies attacked the city early the morning of the 14th and the same afternoon a detachment of Sikhs and Bengal Rajput Infantry under Gaselee reached the British Legation. These were soon followed by the 14th U. S. Infantry and the other nationals. A thanksgiving service marked the close of the siege. The *Te Deum Laudamus* was read by the chaplain of the British Legation. Consult Headland, *Chinese Heroes;* Landor, *China and the Allies;* Martin, *The Siege in Peking;* Matter (Mrs. Calvin), *Siege Days;* Morrison, *Letters to the London Times;* Smith, *China in Convulsion.*

PEKOE, n. *pē'kō* [Chin. *pek*, white; hao, hair or down] kind of tea whose fragrance is much esteemed; so named because, when picked, the young leaves have their 'down' still on: called also *Peekoe* or *Pecco.*

PEL, n. *pĕl:* stake or wooden 'dummy' used in practice by swordsmen striking at it, meanwhile guarding themselves as though against its meditated strokes.

PELA, n. *pē'lâ* [Chin.]: Chinese wax; named from the hemipterous insects from whose waxy secretions it is prepared.

PELADAN, *pā-lâ-dân,* Joséphin ('Le Sar'): French mystical writer: b. Lyons 1858. He became an eccentric and mystic, took the title of 'Sar' (chief), posing as a descendant of the last Babylonian kings and went about in theatric costume. Among his writings are *Rembrandt* (1881); *Introduction à l'Histoire des Peintures* (1884), and a romantic cyclus *Decadence Latine* (1886 et seq.), a mixture of astrology, mysticism, and esotericism, which includes *Le vice suprême* (1886); *Curieuse* (1886); *L'initiation sentimentale* (1887); *A cœur perdu* (1888); *Istar* (1888); *La victoire du mari* (1889); *Cœur en peine* (1890); *L'Androgyne* (1890); and *Le Gynandre* (1891). Apart from this cyclus are *Femmes honnêtes* (1885); and *La décadence esthétique* (1888). He was the founder, in 1892, of the order of La Rose Croix, or Croix du Temple, which was in reality a reaction against the material side of French art. The cult had great vogue for several years.

PELAGE, n. *pĕl'āj* [from Sp. *pelage*, hair (in mass)]: hair, fur, wool, etc., of animals; technical name, correspondent to *plumage* in ornithology.

PELA'GIAN: same as Pelagic (q.v.).

PELAGIAN, n. *pĕ-lā'jĭ-ăn:* a follower of *Pelagius* (q.v.): Adj. pertaining to Pelagius, or to his doctrines.—See Pelagianism.

PELAGIANISM, *pē-lā'jĭ an-ĭzm:* doctrinal system of Pelagius (q.v.), especially on the subjects of the natural condition of man, original sin, grace, free-will, and redemption. For what may be called the external history of the controversy to which the opinions of that remarkable man gave occasion, see Pelagius. The movement, considered in itself, is one of the most interesting in the history of the human mind. At the close of the great controversies on the Trinity and Incarnation, the speculation, which for nearly a century had wearied itself in vain endeavors to make plain the inscrutable mysteries of the divine nature, at length turned inward upon humanity itself; and the careful student of the controversy on P. can scarcely doubt that that prouder view of the capabilities of human nature, which lies at the root of all the theories of which P. was the exponent, was a reaction against the crude and degrading conceptions of the nature and origin of the soul which characterized the philosophy of not only the Manichean teachers, but of all the dualistic religions which sprang from the prolific soil of Gnosticism. To the Manichean, and to all in general who adopted the Gnostic views as to the evil origin and nature of matter and material substances, man was, in his *psychical* nature, evil and incapable of good. The Christian teacher, in combating this view, easily passed into an opposite extreme, and overlooking or explaining away the strong language of the Scripture, was led to represent man as endowed with full capacity for all good; and so long as the only adversaries to be controverted were those who urged the views of the Gnostic school, the line taken by Christian writers was but little guarded by any of those limitations and reserves which have arisen in later controversy: thus the earlier Fathers, especially those of the Eastern Church, where Gnosticism was chiefly to be combated, are found to press earnestly the power for good which man posesses, without entering nicely into the origin or the motive principle of that power. But whatever of vagueness hung over this important subject was dispelled by the bold and precise statements of Pelagius, or at least by the discussion which at once arose thereupon throughout the entire church. Pelagius sought to take away the excuse for wrong doing, that man is under bondage to sin, therefore incapable of doing any good thing. The scandalous laxity of conduct which he saw availing itself of this excuse, may have moved him to his strong assertions of man's natural nobleness of faculty and his consequent responsibility, for right choices and good acts. For his teaching on original sin and on the primitive state of man, see Original Sin. The earliest formal embodiment of these doctrines, for the purpose of obtaining upon them the public judgment of the church, was in a number of articles presented to the council of Jerusalem, 415, by Orosius: see Pelagius. Of these, the first five regarded the doctrines already noticed under Original Sin. The latter portion of the

articles alleged that no grace or aid from God was needed for particular actions; but that free-will and the teaching of the law sufficed; that God's grace is given in proportion to our merits; that free-will would not be free, if it stood in need of aid from God; that the pardon of penitents is granted them not according to God's grace and mercy, but according to their own merit and labor; and that our victory does not come from God's assistance, but from our free-will. Although the final sentence condemnatory of these doctrines (see PELAGIUS) was very generally accepted, yet the recusant party was not lacking in energy and ability. The great champions on each side were Augustine for the orthodox, and Julianus, Bp. of Eclanum, for the Pelagians. For so much of the controversy as regards original sin, see that title: that on grace and free-will was more subtle, and has led to more numerous divisions on the side of orthodoxy as well as of heterodoxy. In order to evade the condemnation of the doctrine originally ascribed to them as to grace, Pelagius and his followers declared that they did not deny the necessity of grace; but by this name they did not understand any real and internal supernatural aid given by God in each particular action, but only either some general external assistance, such as preaching, the Scriptures, good example, etc.; or an aid given which might facilitate and secure the particular work, but which was not necessary for its accomplishment. Whether, indeed, they at any time admitted any real internal grace, is a question. Grace may be of two kinds —that which moves the will, and that which enlightens the understanding. It is necessary, too, to distinguish two periods in the history of P.—one before the appearance of the *Epistola Tractoria* of Pope Zosimus; the other, subsequent. In the first period, the Pelagians seem not to have admitted the necessity of any internal grace whatever; in the latter, they admitted the necessity of a grace of the intellect, but not of the will; or if they seemed to speak of any internal grace of the will, it was only as facilitating man's act, not as at all necessary to his doing it. The Pelagian theory, in a word, was, that man, as coming from his Creator's hand, possessed in himself and as constituents of his own nature, all the powers necessary for the attainment of salvation; that by the faithful employment of these natural powers without any further aid whatever from God, he merits eternal life, and all other rewards, by a strict title of justice; and that, to suppose grace to be necessary, is, in truth, to destroy the essence of free-will. This doctrine was somewhat modified—though not at its deepest root—in the Semi-Pelagian System (q.v.). The Rom. Cath. schools, all without exception, maintain the necessity of grace for the performance, not only of all meritorious, but of all supernatural good works; and they are equally unanimous in maintaining that the grace so given, even that which is called 'efficacious,' does not destroy the freedom of the will. They distinguish between the 'natural' and the 'supernatural' order, and between the powers and gifts proper to the one and to the other.

For the attainment of all the ends of the natural order, they assert that man possesses, by his very constitution, all necessary powers and gifts; and by the proper use of these powers, he is able to merit all the rewards which belong to the natural order. He is able, therefore, without any supernatural grace, to perform morally good works (e.g., acts of natural benevolence, the fulfilment of the ordinary duties to his neighbor, etc.), and to fulfil the purely natural obligations. But in order to works in the supernatural order (such as the love of God above all things for His own sake, faith in Him as the author of all good, etc.), and to the rewards promised for such works, the will of man must be moved and strengthened by supernatural grace, with which the will freely co-operates, but which is a purely gratuitous gift of God—so purely gratuitous, that though God has promised eternal life as the reward of man's co-operation, yet the merit arises entirely from God's gift and promise, and not from the natural powers of the human will.

It has repeatedly been pointed out that P.'s doctrine of man was essentially naturalistic—tending to make divine grace needless, and to deny all immediateness of the divine influence on the human soul. Though P. did not follow out his theory to its logical consequence, the theory itself involved no necessity for the atonement.

Without going into the details of the teaching of the Rom. Cath. schools on this subject, it will be enough to particularize the most remarkable. Of these, the chief are the Molinist, which, giving most to liberty, lies nearest to the border of P., but is clearly distinguished from it by maintaining the necessity of grace for every supernatural act; and the Thomist and Augustinian, which give most to grace, but at the same time expressly preserve the freedom of man's will. The Thomists are often represented as denying the freedom of man's actions under grace; but though it is difficult to explain, in popular language, their method of reconciling both, yet, to those acquainted with the scholastic terminology, their distinction between the infallible efficaciousness of grace, and its imposing necessity on the will, is perfectly appreciable. In this they, as well as the Augustinian school, differ from the Jansenists (q.v.). The Jansenists, indeed, regard the Molinist school as a plain revival of P.; and they profess that they alone represent fully, in their own system, the very same position which St. Augustine formerly maintained against that heresy in its first origin.

In the Reformed Church, the Arminian doctrine may be said to correspond in the main with the Molinist system in the Roman Church. The Gomarists, in most, though not in all particulars, fall in with the Jansenistic views. The Pelagian views are distinctly represented in modern controversy by the Socinians and Rationalists; and indeed very many of those who, outside of the Roman Church, have at various times engaged in the predestinarian controversy on the side of free-will, have leaned toward, if they have not fully adopted, the Pelagian view. In this contro-

versy, however the practice, common in polemics, of imputing to an antagonist the extremest views of the particular side to which he leans, has been especially noticeable. The Jesuits have been stigmatized, even by their Rom. Cath. antagonists, as Pelagians: the Thomists are called by the Jesuits indiscriminately Jansenists and Calvinists; while both unite in representing Calvin and his school as in substance Manichean.

Hardly one among the many Christian controversies has called forth greater subtlety and power, and not one has so long and so persistently maintained its vitality. Within the 25 years which followed its first appearance, more than 30 councils (one of them, the General Council of Ephesus) were held for the purpose of this discussion. It lay at the bottom of all the intellectual activity of the conflicts in the mediæval philosophic schools; and there is hardly a single subject which has come into discussion under so many different forms in modern controversy. Indeed, the subject brings into discussion that profoundest of all problems—the inter-action of God's predestination and man's free-will: Pelagianism (and really Semi-P., q.v.) magnifying free-will, Augustianism, magnifying the sovereign will and grace of God. Milman's remark that 'no Pelagian ever has worked or ever will work a religious revolution,' accords with the observed fact that P. is the creed to which men tend in quiet, uneventful, unheroic times. See JANSEN: ARMINIUS: GRACE: PREDESTINATION: REPROBATION: ORIGINAL SIN: TRADUCIANISM.

PELAGIC, a. *pĕ-lăj'ĭk* [Gr. *pelăgos*, the sea]: pertaining to the deep sea or outer ocean, in contradistinction to littoral or along shore.

PELAGIUS, *pē-lā'jĭ-ŭs:* celebrated theologian, famous opponent of Augustinianism; author or systematizer of the doctrine known as PELAGIANISM (q.v.); b. prob. about or after the middle of the 4th c., in Britain (according to some, in Bretagne); his name being supposed to be a Greek rendering (*Pelagios*, of or belonging to the sea) of the Celtic appellative *Morgan*, or sea-born. Of his early life little is known. He was a monk, but the time and place of his entering that state are unknown; it is certain, however, that he never entered into holy orders. He settled in Rome, and at the end of the 4th c., he had acquired considerable reputation for sanctity and for knowledge of the Holy Scriptures and the spiritual life. P. does not appear to have himself been a very active propagandist; but he had attached to his views a follower of great energy and bold and ardent temper, named Celestius, generally supposed to have been a Scot, which in the vocabulary of that age means native of Ireland. At Rome, however, these men attracted little notice, though they began to make their doctrine public about 405; and in 410, after the sack of the city by the Goths, they withdrew to Africa. After some time, P. made a pilgrimage to Jerusalem, where he met St. Jerome, and for a time enjoyed the regard and confidence of that eminent but hot-tempered scholar. His opinions, however, becoming known, Jerome withdrew from this association.

Celestius having remained at Carthage, and sought to be admitted to ordination, his doctrines became the subject of discussion and in a synod several opinions ascribed to him were condemned. He appealed to Rome, but leaving Carthage without prosecuting the appeal, he passed to Ephesus; and the proceedings taken in Carthage regarding him are important chiefly as having introduced St. Augustine into the controversy. Meanwhile P. remained at Jerusalem; and news of the proceedings at Carthage having been carried to Palestine, P., 415, was accused of heresy before the synod of Jerusalem, by a Spaniard named Orosius. The impeachment failed, probably from the fact that Orosius was unable to speak Greek, the language of the synod; and in a subsequent synod at Diospolis in the same year, P. evaded condemnation by accepting the decrees of the synod of Carthage above referred to, and even obtained from the synod an acknowledgment of his orthodoxy. The West, however, was more sharp-sighted or less indulgent. A synod of Carthage, 416, condemned P. and Celestius, and wrote to Pope Innocent I., requesting his approval of the sentence, with which request Innocent complied by a letter still extant. On the death of Innocent, Celestius came to Rome in person, and P. at the same time addressed a letter to Zosimus, successor of Innocent; and in a council which Zosimus held, Celestius gave such explanations that the pope was led to believe that the doctrines of P. had been misunderstood, and wrote to call the African bishops to Rome. A council of 214 bishops, however, was held in Carthage, in which the doctrines of P. were formally condemned in nine canons, which were sent to Rome with full explanations; and on receipt of these decrees, Zosimus re-opened the cause, cited and condemned Celestius and P., and published a decree, called *Epistola Tractoria*, adopting the canons of the African council, and requiring that all bishops should subscribe them, under pain of deposition. Nineteen Italian bishops refused to accept these canons, and were deposed. Their leader, and the person who may be regarded as the greatest theological advocate of P. in the ancient controversy, was the celebrated Julian, Bp. of Eclanum, near Beneventum, known to every reader of his great antagonist, St. Augustine. P. himself was banished from Rome, 418, by Emperor Honorius. From this date, P. disappears. Of his after-life, nothing is known in detail. Orosius gives an unfavorable account of his later career, but in a period of such excitement, we may not accept implicitly the judgment of an adversary. The most trustworthy accounts show P. to have been a man of devout spirit and of pure life. The controversy, considered as an exercise of intellectual energy, is the most remarkable in the ancient history of the church. But the most important of the writings on the Pelagian side have been lost. Julian is known chiefly through the replies of Augustine. P.'s *Fourteen Books of a Commentary on St. Paul's Epistles*, his *Epistle to Demetrius*, and his *Memorial to Pope Innocent*, have escaped destruction probably from their being included by collectors in the works of St. Jerome. They are much mutilated, but yet

almost certainly genuine. All his other works have been lost, except some further portions, chiefly fragmentary, which (with the above) have been published under the title *Appendix Augustiniana*. After his banishment, P. is supposed to have returned to his native country, and to have died there. Others, however, represent him as having died in Palestine. For his doctrines in detail, see PELAGIANISM.

PELAGO, *pā-lâ-gō:* town in the province of Florence, Italy, on elevated land, about 15 m. e. of Florence, and in the same commune as Vallombrosa, which is the seat of a famous and wealthy convent. Woolen goods and earthenware are manufactured. In feudal times the bishops of Fiesole held P. as a fief. Pop. about 10,000.

PELARGONIUM, n. *pĕl'ar-gō'nĭ-ŭm* [It. *pelargonio;* F. *pelargon*—from Gr. *pelargos*, a stork]: stork's-bill; genus of beautiful flowering plants, ord. *Geraniăcĕæ*. PEL'ARGON'IC, a. *-gŏn'ĭk*, pertaining to.—*Pelargonium* includes many of the most favorite greenhouse flowers, to which the old generic name *Geranium*, is often popularly given. For the characters which distinguish P. from geranium as now restricted by botanists, see GERANIUM. The species are numerous, and mostly s. African; Australia also producing a few. Some are herbaceous, and some are stemless; most of them are half-shrubby. Some have tuberous root-stocks. The leaves show great variety in form, division, etc. The flowers always adhere to a certain type in form, but with great variety in size, color, etc.; they are always in stalked umbels, which arise from the axils of the leaves, or in the stemless kinds from the midst of the leaves. In no genus has the art of the gardener produced more striking results than in this; and the number of beautiful hybrids and varieties is very great, some of them excelling in beauty any of the original species. Some species with little beauty of flower, are cultivated for the odor of their leaves, which in some resembles that of roses; in others, that of apples, lemons, etc., while that of many species is rather unpleasant. The cultivation of P. is similar to that of other *Geraniaceæ:* see GERANIUM. Water must be liberally supplied during the time of flowering: but no plants more strongly require a period of rest, and water must then be very sparingly given. Many of the shrubby kinds may be taken out of the soil, hung up by the roots in a dry dark cellar, or covered with hay, and put aside in a box, in a cool dry loft or garret, care being taken to protect them from frost. Every leaf should be removed before they are taken up, and young watery shoots should be cut off. Another method of treating them is to cut off every leaf before frost comes, and to keep the plants all winter in their pots in a dry, cool room, without giving them a drop of water. By such means, many of this beautiful genus are successfully cultivated by persons who have no greenhouse. PELARGONIC ACID, *pĕl-ar-gŏn'ĭk*, or NONYLIC ACID, *nŏn-il'ĭk* or *nō-nĭl'ĭk* ($C_9H_{18}O_2 = C_8H_{17}.CO_2H$), fatty acid, obtained first from the leaves of *Pelargonium roseum*, in which it exists ready formed. It may be procured by

the action of nitric acid on the oil of rue; also, together with other fatty acids, by the action of boiling nitric acid on oleic acid. It is formed synthetically by the action of boiling alcoholic potash on octyl cyanide, $C_8H_{17}.CN$. It is a liquid having a slightly unpleasant odor, solidifying at 54° and boiling at 487°. *Ethyl pelargonate*, $C_9H_{17}O_2.C_2H_5$, produced by dissolving the acid in strong alcohol, and passing hydrochloric acid through the solution, has a powerful and most intoxicating vinous odor.

PELASGIANS, *pē-lăs'jĭ-anz*, or PELASGI, *pē-lăs'jī* [variously explained as denoting either 'Swarthy Asiatics' (*Pell-Asici*), or 'Storks' (*Pelargoi*)—significative of wandering habits; or as being derived from the biblical *Peleg* (Gen. x. 25), or from the Greek *Pelagos* (the Sea) or *pelazo* (to approach), or *pelein* and *agros* (to till the field), etc.—'a name, in fact,' as Niebuhr says, 'odious to the historian, who hates the spurious philology out of which the pretenses to knowledge on the subject of such extinct people arise']: tribe, or number of tribes inhabiting Italy, Thracia, Macedonia, a part of Asia Minor, and various regions of s. Europe, in prehistoric times. Ethnologically, they belong to the same race as the great stock of the earliest known settlers, that reached from the Po and the Arno to the Rhyndakus (near Kyzikus). Yet as no Pelasgian town or village existed in Greece Proper after B.C. 776, speculation has, ever since the commencement of European historiography, been trying to supply the facts that were lacking for ascertainment of the exact origin and history of these predecessors of the Hellenes and Romans; but so futile have all efforts in this direction remained, that the very term Pelasgi has, from the days of Homer to our own, been used almost arbitrarily to designate either a single obscure division of a tribe like the Leleges and the Dolopes, or as an equivalent for all the Greeks of a very early period. In this latter sense, they are spoken of by Æschylus, Herodotus, Homer; while they are considered one of the branches of the race or races that peopled Greece, by Thucydides, Strabo, and most modern writers—the word thus being not a comprehensive term, like Arian, but a narrowly circumscribed one, like Hindu. Recent investigation seems, as regards their previous history, to lead to the result, that soon after the first immigration of Turanians, they like other tribes left their Asiatic homes, and proceeded toward Europe. They are found at a very early period settled in Asia Minor; and Homer speaks of them as allies of the Trojans. They then seem to have spread themselves, by way of the Propontis and Ægæan, and again by Crete, over many of the islands between the two continents; and finally came to occupy a great part of the Hellenic mainland—Thessaly, Epirus, the Peloponnese, Attica, Macedonia, Arcadia, provinces which, one and all, till the latest period, bore distinct traces of the once undisputed sway of the Pelasgians. According to Herodotus, the Hellenes themselves sprang from them; and there can hardly be a doubt that they formed a most important element in the formation as well of that most gifted of nationalities, as of the Latin people,

(See HELLAS.) The early Etruscans (q.v.) were P. to a certain extent; and the southern tribes of the Peucetians, Œnotrians, and Iapygians are distinctly declared by ancient writers to belong to their race. The step from Greece into Italy is natural enough. What caused their wanderings originally, is difficult to conjecture; but it may reasonably be assumed, that the wanderings were caused to a certain extent by immigrations of eastern tribes, such as the Lydians, Phrygians, Carians, who, as they took possession of their old homes, pushed the P. further and further west. A special stock was formed by the Tyrrhenian P., whose gradual advance in Greece may be traced from Acarnania to Bœotia, thence to Attica, and later still, to the Hellespont, Lemnos, etc. A strong protest, however, must be recorded here on the part of some modern writers against the assumption of others, that the P. were in reality the original population of all Italy, as they were of the greatest part of Greece (Pelasgia). It is absurd, they argue, to suppose that a rich and populous nation, which had held a country like Italy for many centuries, should suddenly, just at the approach of historical times, die out without leaving even such single remnants as the Pelasgic settlements in Greece mentioned by Herodotus. These aboriginal Italian P. are, according to these investigators, a mere hypothesis of ignorant ancient writers, who wished to explain, in an easy manner, the ethnological and philological affinity between the two classical nations, and who, anticipating the questions about a contemporary colony, kill off the whole nation by pestilence and famine.

The P., from what we can glean about them, appear to have been a highly intellectual, receptive, active, and stirring people, of simple habits withal, intent chiefly on agricultural pursuits. Several improvements in this department were distinctly traced back to them, e.g., the plowing with oxen—for which purpose they had to invent the special goad; further, the art of surveying, etc. Yet they were warlike when attacked and driven to self-defense; and the trumpet, which calls the widely scattered troops to the attack, was supposed to have been first used by them. That the art of navigation was known to them, is shown sufficiently by their incessant migrations over sea and land. Of their architecture, in that style which, in default of a better name, has been called Cyclopean (q.v.), remnants are extant. The names Larissa, Argos, Ephyra, frequently met in ancient Greece, were bestowed by them on their fortified cities, and are only generic names, expressive of either mountain fortresses or strongholds in plains. Wishing to remain in peace, they endeavored to keep off the invader by walls so enormously strong, that it seems surprising that they ever could have been taken. Besides these, they built canals, dams, and subterranean waterworks of astounding strength and most skilful construction. The accompanying wood-cut represents the tomb or treasury of Atreus at Mycenæ, vaulted with a fine pointed 'horizontal arch,' 48½ ft. in diameter. Of their sculpture, which they no doubt cultivated to a certain degree, we have but

very small relics, such as a head of Medusa, and a *Xoanon* (Divine Image) of Orpheus; besides these, certain traces of their special mystic worship are found in archaic representations, which, though not hitherto ascribed to them, bear their direct influence upon their very face. How far they

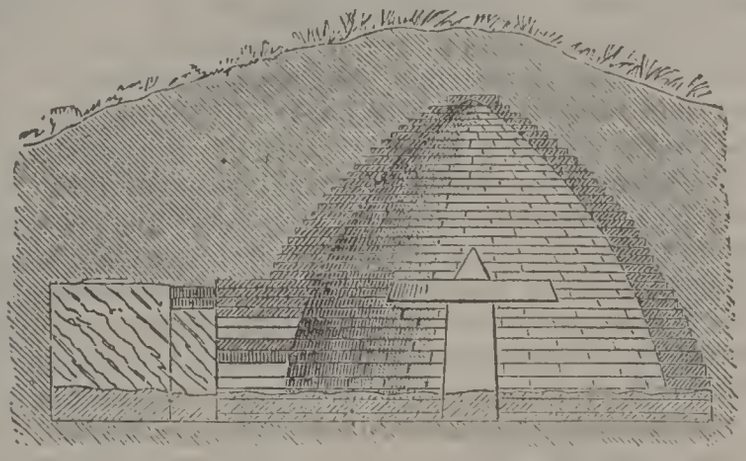


Fig. 1.—Section of Tomb of Atreus at Mycenæ.

were either the inventors of the so-called Cadmean or Phœnician writing-characters, from which all European characters are derived, or merely their 'improvers,' is not to be decided by the contradictory evidence found on the subject: but this at all events is certain, that they were acquainted with the art of writing, and had thus a vast element of culture in their possession before the dawn of history. Respecting their religion and worship, this only is to

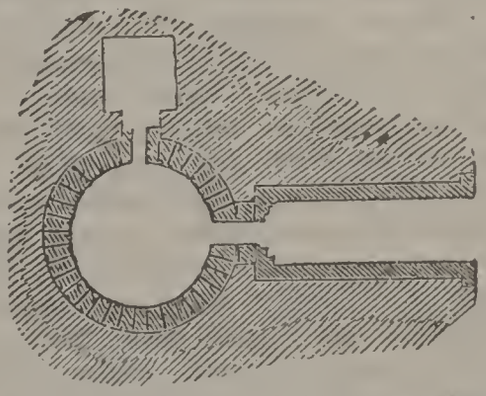


Fig. 2.—Plan of Tomb of Atreus at Mycenæ.

be held with certainty, that it consisted originally in a mystic service of those natural powers whose influence is visible chiefly in the growth of the fruits of the earth. From Egypt they obtained names for their till then nameless gods, generally called by them the Theoi; and they proceeded—by permission of the Dodonic oracle, which, together with the Pythian, they first founded—to bestow upon them individuality. Their deities were, besides the Phœnician Kabiri, Demeter, Persephone Kora, Dionysos, Hermes, Zeus of Dodona, Apollo, Hephæstus, Themis, Pan, etc. Whether those P. who inhabited Lemnos and Imbros, and who were conquered by Darius, offered human sacrifices or not, is doubtful. An ambiguous term of Herodotus respecting the language of those small Pelasgian remnants who had survived to his day has given rise to end-

less unsatisfactory discussions. He speaks (i. 57) of their 'barbarous language;' and the question is, whether he meant that it completely differed from Greek, or that there was only so wide a divergence of dialect, that it had become unintelligible to his contemporaries. Grote inclines to the former opinion; Niebuhr, Thirlwall, T. O. Müller, followed by G. Rawlinson and others, hold with more show of reason, that the term 'barbarous language' indicates merely a corruption or alteration of idiom, such as long lapse of time would infallibly produce; and that it bore the same relation to the Greek of the day as the Gothic does to the German, or the Latin to any of the Romance languages, not to instance the forlorn patois of out-of-the-way places in Switzerland and elsewhere, supposed to be inhabited by unmixed descendants from Roman legions. The other phenomenon of the vast number of roots common to both Greek and Latin—the Latin, it must be remembered, having been proved to be derived, not from the Greek, but from the Oscan—would thus easily be explained by the assumption of a common Pelasgian linguistic (as well as ethnical) stock in both nationalities.

Their political circumstances are as unknown to us as the whole process of transition between them and the real Greek period. From a few scattered allusions, we may conclude that they were not uniformly governed; that some of their multifarious tribes were ruled by priests, while others were under the patriarchal rule of the head of the clan or family.

How they gradually disappeared from the rank of nations, by being either 'absorbed' by superior races (Hellenes, Italici, Carians, Lydians, Phrygians), or being reduced to nameless serf-populations, does not seem so difficult to understand as some writers find it. Hundreds of nations have disappeared in the same manner, and we may even watch the process with our own eyes. Interesting as it might be to dwell more minutely on some of the widely divergent theories and speculations on the P. by historians, philologists, ethnologists, antiquaries, and investigators generally, to whom at all times this people have proved exceedingly attractive, we cannot enter further upon them. We conclude with Grote's dictum: 'If any man is inclined to call the unknown ante-Hellenic period of Greece by the name of Pelasgic, it is open to him to do so. But this is a name carrying with it no assured predicates, no way enlarging our insight into real history, nor enabling us to explain what would be the real historical problem—how, or from whom the Hellenes acquired that stock of dispositions, aptitudes, arts, etc., with which they begin their career.'

PELAYO, *pā-lā'yō:* said by historians to have been the first Christian king in Spain after the conquest of that country by the Arabs; to have been a scion of the royal Visigothic line; and to have died 737. Contemporary historians make no mention of him; but this may be accounted for on the ground of the insignificant size of his kingdom, which comprised only the mountainous district of Asturias. He is said to have retired before the conquering Arabs to the mountains of Asturias, where he maintained himself

against the armies which were sent to attack him, defeating them in various pitched battles, and in numberless minor engagements. One of his most famous exploits was the destruction of a large army sent against him by Tarik, near Cangas-de-Onis. His men were posted on the heights bounding the valley through which the Arabs were to pass, and, waiting till the enemy had become involved in the defile, at a given signal overwhelmed them with enormous masses of rock. This great success caused Pelayo to be recognized as sovereign by the surrounding districts, and the Christians flocked to him from all parts of Spain. He was much engaged in contests with the Arabs, nevertheless found time to reanimate agriculture, superintend the reconstruction of churches and the establishment of a civil administration. Such is the account given by later historians, who trace from him the genealogy of the royal family of Spain.

PELECANIDÆ, *pĕl-ē-kā′nĭ-dē:* family of palmiped birds, the *Totipalmati* of Cuvier; characterized by a long, straight, compressed bill, broad at the base, often with a pouch beneath the lower mandible; long wings, of which the first quill is the longest; short strong legs; and all the toes—including the hind toe—united by a membrane. They are generally excellent swimmers, expert divers, and birds of powerful flight. Some often perch on trees, which few other web-footed birds do. To this family belong pelicans, cormorants, frigate-birds, tropic-birds, and darters.

PELECYPODA, *pĕl-ĕ-sĭp′ō-da,* or *Lamellibranchiata:* the class of *Mollusca* which are distinguished externally by the possession of shells in two parts or 'valves.' They are the bivalves, and include the clams, oysters, cockles, mussels, shipworms, and similar forms. See Bivalves; Mollusca, and the names of various groups and species.

PÉLÉE, *pā-lā′,* Island: largest of the numerous islands in Lake Erie; about 6 m. n. of the group in Put-in-Bay. It belongs to Canada. Its greatest length is from n. to s. nearly 9 m., greatest width 4 m.; 13,000 acres. A large proportion of the land requires draining to fit it for cultivation, but there are considerable areas given to the grape, which thrives and is a source of profit. There is some timber; and large quantities of fine sand for mortar are sold in the large towns and cities bordering the lake. Limestone is quarried. There is considerable game, including deer, wild turkeys, and quail. The island has obtained quite a reputation as a summer resort, and is increasingly popular. It was settled by white men in 1834, and the descendants of the family which then secured a title from the Indians control most of the land. Viticulture began about 1863, and in recent years large quantities of wine have been produced.

PELÉE, Mont, *mŏnt pē'lē* [Fr. *mŏn pālā*]: Martinique, West Indies, an active volcano in the northwestern part of the island, noted for its eruptions in 1902, that of May 8 destroying the town of St. Pierre (q.v.), and nearly 30,000 people, and that of August 30 destroying Morne Rouge, Ajoupa-Bouillon, and other localities, with a loss of about 2,500 persons. Previously recorded eruptions were those of 1762 and 1851.

Prior to 1902 the mountain was characterized as a lofty, solitary peak about 4,600 feet high with gradual slopes. Its crater was about one and a half miles in circumference and had a depth of from 1,000 to 2,000 feet below the level of the crater rim. On the southwest side the crater rim was breached to the base by a great gash which continued into the gorgs of the Rivière Blanche; over twenty other ravines and waterways indented the mountain slopes. Within the great crater lay L'Etang Sec, a small crater lake. Since the eruptions of 1902 the crater has increased in width toward the east, south, and southwest, the tuff walls on the east and south are almost if not quite vertical, while the V-shaped gash in the southwestern rim is wider and the southern side of it has been cut away and is now filled by volcanic debris. Over 180 feet of the summit was blown away, and the crateral basin L'Etang Sec disappeared, but from it an enormous obelisk of polished rock with a basal thickness of 300 to 350 feet has extruded to a height of 1,600 feet or more, towering above the lowest portion of the present crater rim 475 feet, and giving Mont Pelée a varying altitude of from 5,100 to 5,140 feet as the extrusion continues and fragments break away from its summit. Profs. Heilprin, Giraud, Sapper, Hovey, and Lacroix, among the scientists who made personal observations of the volcano, its operations, and changes, confirm the theory advanced by Lacroix that Mont Pelée is to be classed as a cumulo-vocano. (See Martinique.) Consult Heilprin, *Mont Pelée and the Tragedy of Martinique* (1903); Hill, *Report on the Volcanic Disturbances in the West Indies*, in *National Geographic Magazine* (1902); Hovey, *Martinique and Saint Vincent*, in American Museum of Natural History *Bulletin* (1902); Russell, *Phases of the West Indies Eruption*, in *Century Magazine* (1902).

PELE'IDES: in Greek mythology, a son of Peleus. See Achilles.

PELERINE, n. *pĕl'ĕr-ĭn* or *ēn* [F. *pèlerine*, a tippet]: a lady's long cape with ends coming down to a point.

PELE'S HAIR, n. *pē'lēz: a* fine glassy hair-like substance found in the Sandwich Islands, blown from the liquid lava jets of the volcano Kilauea—so called from *Pele*, the goddness of this volcanic mountain.

PELEUS, *pē'lūs* or *pē'lé-us:* in Greek mythology, the king of the Myrmidons, and the father of Achilles (q.v.).

PELEW, *pē-lū'* (or PALAU, *pâ-loú*) ISLANDS: group of about 26 islands in the n. Pacific Ocean, formerly belonging to Spain, 450 m. e. of the Philippines, lat 7°—8° 30′ n., long. 134°—136° e., at the w. extremity of the Caroline Archipelago. The islands are mostly coral and uninhabited, and which form a chain extending about 120 m. from s.s.w. to n.n.e. The principal island is Babelthuap, 28 m. by 14, containing a mountain whose summit gives a view of the whole group. As seen from the sea, the islands appear mountainous and rugged; but the soil is rich and fertile, and water is abundant. bread-fruit, cocoa nuts, bananas, sugar-cane, lemons, oranges, and other tropical trees and fruits, are on the coasts. The inhabitants are of Malay race. They show considerable ingenuity in building their canoes, are active agriculturists, and have exceedingly primitive notions regarding dress, as the men go entirely naked, and the women nearly so. In 1783, the *Antelope* was wrecked upon the P. I., and the crew were treated by the natives with the greatest kindness. In 1899 Spain sold to Germany the Caroline, Pelew, and all of the Marianne or Ladrone Islands (excepting Guam, the largest, ceded to the United States in 1898) and constituted the groups the German New Guinea Protectorate. The Pelew islands are said to have been discovered by the Spaniards 1545.

PELF, n. *pĕlf* [OF. *pelfre*, goods, especially those obtained by plundering; *pelfrer*, to plunder: perhaps connected with L. *pilare*, to rob]: money; riches; wealth, generally in an ill sense.

PELICAN, n. *pĕl'ĭ-kăn* [F. *pélican*—from mid. L. *pelĭcānus*—from Gr. *pelĕkan*—from *peleka'ō*, I hew with an ax, I peck], (*Pelecanus*): genus of birds of family *Pelecanidæ* (q.v.), having a very long, large flattened bill, the upper mandible terminated by a strong hook, which curves over the tip of the lower one; beneath the lower mandible, which is composed of two flexible bony branches meeting at the tip, a great pouch of naked skin is appended; the tongue is very short, and almost rudimentary; the face and throat are naked; the wings of moderate length, the tail is rounded. The species are widely distributed, frequenting the shores of the sea, lakes, and rivers, and feeding chiefly on fish. Although birds of powerful wing, they are seldom seen at a great distance from land. All are birds of large size. They take their prey by hovering over the water, and plunging upon it when it appears. They fly often in large flocks, and the sudden swoop of a flock of pelicans at a shoal of fish is a striking and beautiful sight. They store up their prey in their pouch, from which they bring it out at leisure, either for their own eating, or to feed their young. The pouch is capable of being wrinkled up into small size, and of being greatly distended.—The COMMON P. (*P. onocrotalus*) is as large as a swan, white, slightly tinged with flesh color; and in old birds, the breast golden yellow. The quill-feathers are black, but are scarcely seen except when the wings are expanded. It is a native of eastern parts of Europe, and of many parts of Asia and Africa; and fre-

quents the sea-coast, also rivers and lakes. It makes a nest of grass on the ground in some retired spot near the water, often on an island, and lays two or three white eggs. The parents are said to carry to their young water as well as food, in their pouch. During the night, the P. sits with its bill resting on its breast. The nail or hook which ter-

Pelican (*Pelecanus onocrotalus*).

minates the bill is red, and Mr. Broderip supposes that the ancient fable of the P. feeding its young with blood from its own breast has originated from its habit of pressing the bill upon the breast, in order the more easily to empty the pouch, when the red tip might be mistaken for blood.—The RUFOUS-NECKED P. (*P. fuscus*) abounds in the W. Indies and in many parts of America. Other species are found in other parts of the world, and in some places the number of pelicans is prodigious, particularly in some of the most southern parts of the world.

In heraldry, the P. is drawn with her wings endorsed, and wounding her breast with her beak. When represented in her nest feeding her young with her blood, she is called a pelican *in her piety*.

Pelican, in Heraldry.

PELION, *pē'lĭ-on:* ancient name of a wooded mountain range in Thessaly, along the e. coast. Its e. side descends in steep and rugged precipices to the sea. Further n., near the mouth of the Peneus, is the steep conical peak of Ossa (q.v.), which, according to the classic myth, the Titans placed upon the summit of P., in order to scale Olympus, the abode of the gods. The modern name is Zagorá, and as of old, its sides and summit are clothed with venerable forests of oak, chestnut, beech, elm, and pine.

PELISSE, n. *pĕ-lēs'* [F. *pelisse*—from mid. L. and It. *pelliciă*—from L *pellis,* a skin]: a robe made of fur; a furred robe for men; a dress or habit opening in front, worn by ladies.

PELISSIER, *pā-le-se-ā'*, Jean Jacques Amable, Marshal of France, Duc de Malakhoff: 1794, Nov. 6—1864, May 22; b. Maromme, near Rouen. His father was a small farmer, little above the degree of a peasant. P. studied at the Lyceum at Brussels. At the age of 20 he gained admission to the celebrated French artillery college of La Flèche, and was soon transferred to the special school of St. Cyr. He entered the artillery of the Royal Guard as sub-lieut. 1814, and being transferred to the 57th regt. of the line, which was not called upon to do duty after the return of Napoleon from Elba, he escaped the dilemma of declaring either for or against the emperor. He served on the staff in Spain 1823; made the campaign of the Morea 1828; joined the first expedition to Algiers 1830 as major of cavalry; and 1839 returned to Algeria with the rank of lieut.-col. He commanded the left wing of the French army at the battle of Isly. In 1845 he acquired unenviable notoriety by suffocating more than 500 Arabs who took refuge in the caves of Ouled-Riah in the Dahra. Marshal Soult, then minister of war, did not venture to approve this atrocity, but Marshal Bugeaud, commander-in chief in Algeria, declared that P. only carried out his positive orders. By 1850 he had attained the rank of gen. of division. When the news of the *coup d'état* reached Algiers, he espoused the cause of the emperor, and placed the province of Algiers under martial law until order was restored. In the war with Russia, he obtained 1855 the command of the first corps of the Crimean army, and soon succeeded Marshal Canrobert in chief command, when a change came over the fortunes of the campaign. The Russians were defeated on the Tchernaya; and Sep. 8, the Malakhoff, the key of Sebastopol, was carried. After the fall of Sebastopol, P. received a marshal's baton, and on his return to France was created Duc de Malakhoff and a senator, and received a dotation of 100,000 francs. He received also the order of a G C.B. from Queen Victoria. In 1858 he came to London as the French ambassador, but resigned his post, for which he had little relish, in the following year. He was then named gov.gen. of Algeria, where he died of congestion of the lungs.

PELL, n. *pĕl* [OF. *pel*, a skin—from L. *pellis*, a skin: It *pelle*]: a skin or hide; a parchment roll. Clerk of the pells, *formerly*, an officer of the exchequer who entered every teller's bill into a parchment roll.

PELLA, *pĕl'la:* ancient capital of Macedonia, birthplace of Alexander the Great; on a hill, surrounded by marshes. It was a wealthy and powerful city, but declined under the Romans until it became a place of no consequence, and in the middle ages there remained only a strong castle called *Bodena*. Its site has been identified with that of the village of *Neokhori*, or *Yenikiuy*, near which is a spring called Pelle

PELLAGRA, n. *pĕl-lā'grā* [L. *pellis*,, the skin; Gr. *agra*, a catching]: formerly the name of a loathsome skin-disease, supposed to be endemic to the rice-producing part of n. Italy, and called Italian leprosy; now designating a group of phenomena, of which the most prominent and significant are mental. Allied affections have recently been described in various continental countries; but as presented in its most intense form in Lombardy, Pelagra consists in the skin being covered with tubercles and rough scales, in debility, vertigo, inability to preserve equilibrium, epilepsy, and great depression of spirits. The melancholia which constituted the latter stage often led to suicide, and so frequently to destruction by drowning, that it was distinguished as a special form of the tendency by the appellation of Hydromania. It is believed that this malady results from the use of diseased maize as the chief article of diet, but other factors, such as insufficient nourishment; filth, alcohol, and the ordinary agents in human degeneration are at work. Strychnine, arsenic, and quinine are often of service in the treatment, and massage and electricity are useful adjuvants.

PELLET, n. *pĕl'lĕt* [F. *pelote*, a small hand-ball—from It. *pillotta*—from L. *pila*, a ball: W. *pel*, a ball]: a little ball: v. in *OE.*, to form into little balls.

PELLETIER, *pĕl-lĕ-tē'ā*, Sir Charles Alphonse Pantaleon: Canadian statesman: b. Rivière Ouelle, P. Q., 1837, Jan. 22. He was graduated from Laval University in 1858, studied law and was admitted to the bar in 1860, becoming Queen's Counsel in 1879. He sat in the Dominion parliament for Kamouraska 1867–77, was minister of agriculture, 1877–8, was made speaker of the senate in 1896, having been a member of that body from 1877, and was knighted in 1898.

PELLICANUS, *pĕl-lĭ-kā'nŭs*, Conrad: 1478–1556; b. Alsace. After acquiring some knowledge of Latin he taught in a convent school with no pay except the privilege of taking books from its library. An uncle who kept him sixteen months at the Univ. at Heidelberg, changed his name from Kürsner to Pellicanus. He joined the Franciscans, but later became a Protestant. He studied Hebrew at Tübingen without a teacher, and 1501 wrote the first Hebrew grammar which appeared in a European tongue. After the change in his religious views he was called to Zürich as prof. of Hebrew, and remained there till his death. He pub. a commentary on the Bible, 7 vols., and left his autobiography in Latin.

PELLICLE, n. *pĕl'lĭ-kl* [F. *pelicule*—from L. *pellic'ula*, a small skin—from *pellis*, skin]: a thin skin or film; a fine film or crust which forms on a liquid mixture during evaporation; in *bot.*, an extremely delicate superficial membrane or skin. Pellicular, a. *pĕl-lĭk'ū-lĕr*, relating to or connected with a pellicle.

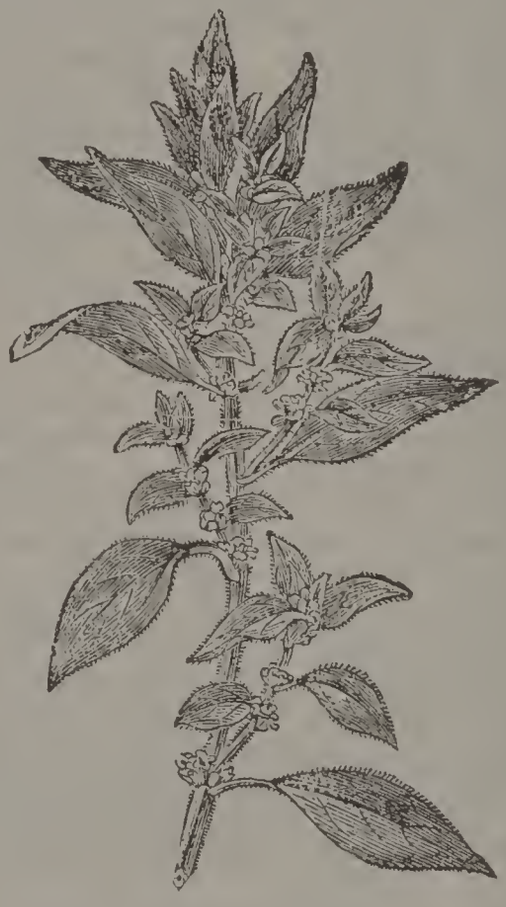
PELLICO, *pĕl'lē-kō*, SILVIO: Italian poet, noted for his long and cruel imprisonment by the Austrians, more, perhaps, than for his verses: 1788, June 24—1854, Jan. 31; b. Saluzzo in Piedmont. He was educated in Pignerol where his father, Onorato P., also favorably known as a lyric poet, had a silk-factory. In his 16th year, P. accompanied his sister Rosina (on her marriage) to Lyon, where he remained until Foscolo's *Carme de' Sepolcri* awakened in him a strong patriotic feeling and an irresistible desire to return to Italy. Coming, about 1810, to Milan where his family were then settled, he was warmly received by Ugo Foscolo and Vincenzo Monti, and was employed as tutor in the family of Count Porro, in whose house all the most distinguished men in Milan were accustomed to meet. His tragedies of *Laodamia* and *Francesca da Rimini* gained him an honorable name among Italian poets. He also translated the *Manfred* of Byron with whom he had become acquainted. He lived in great intimacy with the most eminent patriots and authors of liberal views, and took active part in a periodical called *Il Conciliatore*, which after a time was suppressed on account of its liberal tone. Having become connected with the secret soc. of the Carbonari, then the dread of the Italian govt., P. was apprehended 1820, and sent to the prison of Sta. Margherita, where his friend the poet Maroncelli also was confined. In the beginning of the following year, he was carried to Venice, and 1822, Jan., to the prison on the isle of San Michele, near Venice; and Maroncelli and he were at last condemned to death; but the emperor commuted the sentence to 20 years imprisonment for Maroncelli, and 15 years for Pellico. 1822, Mar., they both were conveyed to the subterranean dungeons of the Spielberg. 1830, Aug., however, they were set at liberty. P. published an account of his sufferings during his ten years' imprisonment, under the title *Le mie Prigioni* (Paris 1833), which has been translated into other languages, and has made his name familiar. P.'s health, never robust, was permanently injured. The Marchioness of Barolo received him into her house at Turin as her secretary. P. subsequently published numerous tragedies and other poems, and a little catechism on the duties of man.

PELLITORY, n. *pĕl'lĭ-tĕr-ĭ* [Sp. *pelitre*, pellitory of Spain: OF. *paritoire*—from L. *parĭĕtārĭă*, the pellitory or wall-plant—from *parĭēs*, a wall]: a name applied to several plants, sometimes used in medicine.

PELLITORY, or PELLITORY OF THE WALL (*Parietaria*): genus of plants of nat. order *Urticeæ*, having both unisexual and hermaphrodite flowers on the same plant, the perianth of both kinds 4-fid. The COMMON P. (*P. officinalis*), which grows on old walls and heaps of rubbish in many parts of Europe and Asia, is a herbaceous perennial with prostrate branched stems, more rarely with erect stems, ovate leaves, and inconspicuous flowers. It sometimes attracts attention from the manner in which the pollen is copiously discharged in hot summer days by an elastic movement of the filaments. It was for

merly much esteemed as a diuretic, refrigerant, and lithontriptic. Its properties depend on nitre, which it contains.

Pellitory of Spain (*Anacyclus pyrethrum*): plant of nat. order *Compositæ*, of a genus nearly allied to Chamomile (q.v.), native of the Levant and of Barbary, and cultivated to some extent in Germany and other countries. It has procumbent, branched, downy stems; each branch one-flowered; the root-leaves pinnate, with pinnatifid segments and linear-subulate lobes. The flowers (heads of flowers) have a white ray, purplish beneath, and a yellow disk. The root is spindle-shaped and fleshy, and when dried is about the thickness of the little finger, inodorous, breaking with a resinous fracture. It has a very peculiar taste, slight at first, but becoming acidulous, saline, and acrid, with a burning and tingling sensation in the mouth and throat, which continues for some time. It is valued in medicine, and is chewed or administered in the form of a tincture to relieve toothache, also in cases of paralysis of the tongue, as a sialogogue in certain kinds of headache, and of rheumatic and neuralgic affections of the face, and is used as a gargle in relaxation of the uvula. The powder of it enters into the composition of certain cephalic snuffs, and is rubbed on the skin in some eastern countries to promote perspiration. It is the *Radix pyrethri* of the pharmacopœias. It is a powerful local irritant. The plant cultivated in Germany has more slender roots than that of the Levant, and has sometimes been described as a distinct species (*A. officinarum*), but is probably a mere variety.



Pellitory (*Parietaria officinalis*).

PELL MELL, ad. *pĕl mĕl* [F. *pêle mêle;* OF. *pesle-mesle,* confusedly—from F. *pelle,* a shovel; *mêler,* OF. *mesler,* to mix—*lit.,* to move or mix with a shovel]: with confusion, hurry, and violence; all in a heap.

PELLS, *pĕlz,* CLERK OF THE [Lat. *pellis,* a skin]: clerk belonging to the court of exchequer in England and Ireland, whose office was to enter every teller's bill into a parchment or skin, called *pellis receptorum,* and also to make another roll of payments, *pellis exituum,* which showed the warrant under which the money was paid. The office was abolished 1834.

PELLUCID, *a. pĕl-lū'sĭd* [F. *pellucide*—from L. *pellūcĭdus,* transparent; *per,* through; *lūcĭdus,* shining—from *lux,* light: It. *pellucido*]: transparent; perfectly clear. PELLU'CIDLY, ad. *-lĭ.* PELLU'CIDNESS, n. *-nĕs,* or PELLUCID'ITY, n. *-ĭ-tĭ,* perfect clearness; transparency.

PELOPIDAS: *pē-lŏp'ĭ-das* · Theban general, of noble descent; noted among his fellow-citizens for his disinterested patriotism; d. B.C. 364. The inviolable friendship between himself—one of the richest men in Thebes—and Epaminondas—one of the poorest—is among the most beautiful things in Greek history. B.C. 382 he was driven from Thebes by the oligarchic party, who were supported by the Spartans, and was forced to seek refuge at Athens, whence he returned secretly with a few associates B.C. 379, and recovered possession of the Kadmeia, or citadel, slaying the Spartan leader, Leontiades, with his own hand. Plutarch gives a vivid picture of the adventurous exiles gliding quietly in disguise into the city on a winter afternoon, amid bitter wind and sleet. Having been elected Bœotarch, in conjunction with Melon and Charon, he set about training and disciplining his troops, so that they soon became as formidable as the Lacedæmonians, and were successful in several small encounters with the latter. His 'sacred band' of Theban youth largely contributed to the victory of Epaminondas at Leuctra B.C. 371, but failed in a subsequent attack on Sparta itself. In the expedition of the Thebans against the cruel tyrant, Alexander of Pheræ B.C. 368, he was, after several important successes, treacherously taken prisoner when in the character of an ambassador; but was rescued by Epaminondas in the expedition of the following year. He was then sent to Susa, as ambassador from Thebes, to counteract the Spartan and Athenian intrigues at the court of Persia, and conducted himself nobly there. His diplomacy was successful. B. C. 364, a third expedition was planned against Alexander of Pheræ, who as usual, was threatening the Thessalian towns. The command was given to P., and in the summer he marched into Thessaly, where he won the battle of Kynoskephalæ, but was killed while too eagerly pursuing the foe. He was buried by the Thessalians with great pomp.

PELOPONNESIAN, a. *pĕl'ŏ pŏn-nē shan* [Gr. *Pelops,* Pelops; *nēsos,* an island]: of or relating to Peloponnesus or Morea, in Greece N. a native of Peloponnesus. PELOPONNESIAN WAR (see GREECE).

PELOPONNESUS, *pĕl-ō-pŏn-nē'sŭs* (i.e., the isle of Pelops), now called the MOREA (q.v.): peninsula, which formed the s. part of anc. Greece—Hellas Proper being situated northward of the isthmus on which stood the city of Corinth: see GREECE. Area, less than 9,000 sq. m. In the most flourishing periods of Grecian history the P. had a pop. of more than 2,000,000: present pop. little more than 500,000. Among its most important cities were Sparta in Laconia, and Argos, cap. of Argolis. Sparta acquired, after the Messenian War, a decided supremacy over the other states, and disputed the supremacy with Athens in a war of almost 30 years duration B C. 431–404—the famous 'Peloponnesian War,' of which the history has been written by Thucydides. After the Roman conquest, the P. formed part of the province of Achaia, and subsequently belonged to the Byzantine empire. For its later history, see MOREA.

PELOPS, *pē'lŏps*, in Greek Mythology: grandson of Zeus and son of Tantalus; slain by his father, and served up at an entertainment which he gave to the gods, in order to test their omniscience. They were not deceived, and would not touch the horrible food; but Ceres, being absorbed with grief for the loss of her daughter, ate part of a shoulder without observing. The gods then commanded the members to be thrown into a cauldron, out of which Clotho brought the boy again alive, and the want of the shoulder was supplied by an ivory one.—According to the legend most general in later times, P. was a Phrygian, who, being driven by Ilos from Sipylos, came with great treasures to the peninsula—which derived from him the name Peloponnesus, married Hippodamia, obtained her father's kingdom by conquering him in a chariot-race, and became the father of Atreus, Thyestes, and other sons. But in what appear to be the oldest traditions, he is represented as a Greek, and not as a foreigner. He was said to have revived the Olympic games, and was honored particularly at Olympia.

PELORIA, n. *pĕ-lō'rĭ-ă* [Gr. *pelōr*, a monster]: in *bot.*, a form assumed by certain flowers, which, being unsymmetrical in their usual state, become symmetrical, in what may be considered as a return to their normal type, as when *Linăria* in place of one spur produces five. PELORIZATION, n. *pĕl-ō-rī-zā'shŭn*, the act or process of the reversion of a flower usually irregular to the regular form.

PELOUSE, *pĕh-lôz'*, LEON GERMAIN: French painter: b. about 1840, at Pierrelaye, Seine-et-Oise. He exhibited the first time 1865. His *A Corner of Cernay in January* was bought by the govt. and is in the Luxembourg gallery; *Evening at the Farm*, in the *Musée* of Grenoble, etc. At the expositions of 1873, 76, and 89, he received 1st and 2nd class medals, and was made chevalier of the Legion of Honor 1878. A French critic says that his pictures are full of the grand sentiment of nature; can be characterized only in poetry of the heart, expressed in Alexandrines; and are comparable with the works of Rousseau, Diaz, Millet, and Corot.

PELOUZE', THÉOPHILE JULES: French chemist: 1807-67; b. Valognes, Manche. He came to Paris 1827, entering the laboratory of Gay-Lussac; was prof. of chem. at Lille 1830, but the next year returned, and was tutor of chem. in the polytechnic school, and assayer; 1836 he was with Liebig, making researches in organic chem.; 1837, asst. of Thénard of the Coll. of France, and succeeded him the same year, serving till 1851; then commissioner of the mint and member of the municipal council, after which he continued to direct a laboratory school that he had founded 1846. He published a great many memoirs; also, with Frémy, a general analytic chem., 6 vols., 3 editions (1853–60), abridged in 3 vols. Besides his discoveries of new acids and salts, he improved processes of tanning, glass-making, etc.; identified beet-sugar with cane sugar; with Liebig, discovered œnanthic ether; invented artificial avanturine; was the first in France to prepare gun-cotton; and with M. Genlis first produced synthetically a fatty body from glycerine and an acid. He died in Paris.

PELT, v. *pĕlt* [Sp. *pelotear*, to throw snow balls at each other, to quarrel: F. *peloter*, to toss like a ball—from *pelote*, a ball: W. *pel*, a ball: perhaps connected with L. *pello*, I drive]: to use like a pellet; to assail or attack with something thrown or driven; to throw at; in *OE.*, to be in a rage: N. a blow or stroke from something thrown; in *OE.*, rage; passion. PELT'ING, imp.: N. an assault with some violence by something thrown. PELT'ED, pp. PELT'ER, n. *-ẽr*, one who pelts.

PELT, n. *pĕlt* [L. *pelta*, a shield or target]: a kind of buckler. PELTA, n. *pĕl tă*, a buckler; in *bot.*, a flat shield without a rim; a metal toe-piece for a boot or shoe. PEL'TATE, a. *-tāt*, in *bot.*, resembling a round shield; fixed to the stalk by a point within the margin. PEL'TATELY, ad. *-lĭ*. PELTATE-HAIRS, in *bot.*, hairs that are attached by their middle. PELTATE-NERVED, a. in *bot.*, applied to a leaf the nerves of which radiate from the centre.

PELT, n. *pĕlt* [Ger. *pelz*, fur, a hide: F. *pelletier*, a furrier; *pelleterie*, the shop or trade of a peltmonger—from OF. *pel*, a skin—from L. *pellis*, a skin: comp. Gael. *peall*, skin]: a raw hide; the skin of a beast with the hair attached; the quarry of a hawk all torn. PELTMONGER, n. *-mŭng'gẽr* [see MONGER]: a dealer in pelts or raw hides. PELTRY, n. *pĕl'trĭ*, fur-skins of wild animals as received from the hunters; fur-skins in general. It is understood to mean only skins undressed, except by drying, and chiefly those which, when dressed, are called furs; and it has been applied especially to the product of the N.W. Territory (Hudson's Bay Territory) of Brit. N. America; though all others are now included.

The pelts of many animals in their original state do not appear well fitted for decorative or even ordinary apparel, but the art of the furrier changes them greatly. The discovery that the long hairs which project over the fine under-fur of many species are also deeper rooted in the skin, has given rise to an easy and admirable method of remov-

ing them completely. The pelts are stretched and passed through a paring-machine, which pares the flesh side with such nicety that it takes off a thin layer, and cuts only through the roots of the coarse, deep-seated hairs, which are consequently easily shaken or brushed out. In this way, and by dyeing the fur, excellent imitations of the costly seal-skins, etc., are prepared from musquash, hare, and other common pelts. See FUR.

The most important of the marine fur-bearing animals are the Alaskan fur seals and the sea otter.—*Seals* (see SEAL, *Phoca*). Of the many varieties in various oceans, the fur seal of Alaska holds the highest place in the commercial world; and since the acquisition of Alaska by the United States, the controlling and protection of the seal fisheries has become a national concern. The superior quality of the fur, and the readiness with which countless numbers of the animal can be secured, has caused grave fears lest the animal suffer extermination, and congressional action is constantly stirred regarding the matter. The method of preparation of the skin is as follows: On being removed from the body it is first salted by sprinkling salt abundantly on the flesh side, when after about three weeks of this procedure as a 'pickling' process, the skins are tied up in bundles of two, and are ready for shipment from the catching-grounds. The Alaskan Commercial Company are permitted to take 100,000 seals a year. 1870–81 this company paid into the treasury of the United States $2,896,927.75 as a special tax; to which was added a rental of $555,480.75, giving a total of income during that time of $3,452,408.50 to the national treasury. The great mass of seal pelts are taken to England, the cost of dressing them being there much less than in the United States. In Newfoundland and along the contiguous coasts the seals are denominated 'hair seals.' Their skins are used principally for making fancy patent leather, for trunk covers, harness work, and to some extent as a 'trimming' for various kinds of manufactures, coats and cloaks included. In 1890 the catch was 500,000, and in some previous seasons it has amounted to 650,000. By the laws of Newfoundland sealing vessels are not permitted to begin their voyages until March 1, and steamers not before March 10.—The *Sea Otter* is a very large animal, with soft, black fur. Many of the longer hairs are tipped with white, and add greatly to the beauty of the fur. The pelt in general is of oval form, about six feet in length, with a breadth of nearly four feet. The animal seldom visits the land except to bring forth its young. It sleeps on the surface of the water, floating on its back. The Alaskan natives are its principal hunters, going out in large numbers when the weather is favorable. Arriving at the rendezvous, often out of sight of land, they form in a straight line, abreast, and move slowly forward, paddling softly so as to make no disturbance. When the nose of an otter is seen, the Aleut throws his dart (of late years superseded by the rifle), and every one of his companions is ready for the second appearance of the otter. When the animal,

worn out by repeated divings, lies exhausted on the surface of the water, he becomes an easy prey. The tails are cut off and sold separately from the skins; and in the past, strangely, there was always a large difference between the number of tails and the number of skins sold to the Russian-American Company (now out of existence), though the Aleuts were forced by the company to sell to it all the fur, whether skins or tails. The animal was formerly abundant on the Pacific coast as far as the coast of Lower California, and the skins were worth from $200 to $500 each. The peculiar fancy that once existed for them has greatly declined, and they form a much smaller item in the list of peltries than formerly; the number of otter skins annually sent to the world's market rarely reaches 6,000.

PELTING, a *pĕlt'ĭng* [see PELT]: in *OE., paltry.*

PELTRY: see under PELT 3.

PELUSIUM, *pē-lū'zĭ-ŭm:* Greek name of an anc. Egyptian city, at the n.e. angle of the Delta of the Nile; important as the key of Egypt on the Asaiatic side. The e. mouth of the Nile derived from it the epithet Pelusian (*Ostium Pelusiacum*). Pelusium is called *Sin* in the Old Test.; and both words, as well as the native Coptic or Egyptian name *Peremoun*, or *Peromi*, signify the mud-city. The *Ostium Pelusiacum* was choked with sand as long ago as B.C. 1st c., and its distance from the sea has ever since been increasing. Pelusium appears to have originally borne the name Anaris, or Abaris; it is so called by Manetho, who attributes its foundation to the Hyksos about B.C. 2,000; but it figures in semi-authentic history first as the scene of Sennacherib's defeat, when (according to the Egyptian tradition, reported by Herodotus) the camp of the Assyrians was invaded at night by a host of field-mice, who gnawed their bowstrings and shield-straps, so that in the morning, when the Egyptians fell upon them, they were defenseless. For the Hebrew account of Sennacherib's defeat see II Kings, xviii., xix., B.C. 525, Cambyses overthrew, near Pelusium the forces of Pharaoh-Psammetichus. The city was taken also by the Persians B.C. 309; and in B.C. 173, it was the scene of the defeat of Ptolemy Philometor by Antiochus Epiphanes. Mark Antony captured it B.C. 55.

PELVIMETER, n. *pĕl-vĭm'ĕtĕr* [L. *pelvis*, a basin; Gr. *metron*, a measure]: an instrument for measuring the dimensions of the pelvis.

PELVIS, n. *pĕl'vĭs* [L. *pelvis*, a basin: Gr. *pella*, a dish or bowl]: the bony cavity forming the lower part of the abdomen, containing several of the internal organs; also that portion of the kidney into which the orifices of the infundibula empty and from which the ureter passes to the bladder (see KIDNEY). The pelvis is a bony ring interposed between the spinal column and

the lower extremities, so as to transmit the weight of the former to the latter. Before considering the pelvis as a whole, it is expedient to consider the individual bones of which it is composed. These, in the adult, are four in number, viz., the two ossa innominata, which constitute its sides and front, and the sacrum and coccyx, which complete it behind. The *os innominatum* receives its name from its bearing no resemblance to any known body, and is a large irregular-shaped bone. In the young subject, it consists of three separate bones, which meet and form the deep, cup-shaped cavity (the *acetabulum*) a little below the middle of the outside of the bone, and in which the head of the thigh-bone rests. Hence it is usual to describe this bone as consisting of the ilium, the ischium, and the pubes. The *ilium* is the superior, broad, and expanded portion which forms the prominence of the hip, and articulates with the sacrum. This bone may be described as divisible into an external and an internal surface, a crest, and an anterior and posterior border. The external surface (see fig. I.) is convex in front and concave behind; it is bounded above by the crest, below by the upper border of the acetabulum (see fig. II.), and in front and behind by the anterior and posterior borders. It presents various curved lines and rough surfaces, for the attachment of the *glutæi* and other powerful muscles connecting the pelvis and the lower extremities. The internal surface, which is smooth and concave, has the same boundaries as the external, except inferiorly, where it terminates in a prominent line, termed the *linea ilio-pectinea*. The surface of the crest is convex, roughened, and sufficiently broad to admit of the attachment of three planes of muscles. The borders are shown in fig. I. The *ischium* is the inferior and strongest portion of the bone. It consists of a thick and solid portion, the *body* (whose inferior part is termed the *tuberosity*), and a thin ascending portion, the *ramus*. In the ordinary sitting position, the whole weight of the body rests on the ischium; and by sitting on the hands, we can usually feel the part (the *tuberosity*, see fig. 1. 15) through which the weight is transmitted. The *pubes* is that portion which runs horizontally inward from the inner side of the acetabulum for about two inches, then descends obliquely outward for about the same length, thus making an acute angle with its original direction. The former part is called the *body*, and the latter the *ramus*, of the pubes. The ramus is continuous with the ramus of the ischium. Between the ischium and pubes is a large aperture, known as the *thryoid* or *obturator foramen*, which in the living body is closed by a membrane termed the *obturator ligament*. The object of this large foramen is probably to give lightness to the parts, without materially diminishing their strength.

The development of the os innominatum affords an excel-

lent example of the general principles laid down in the article OSSIFICATION. There are no less than *eight* centres of ossification for this bone: three primary—one for the ilium, one for the ischium, and one for the pubes—and five secondary ones for various processes, etc. The first centre appears in the lower part of the ilium, at about the same period that the development of the vertebræ commences, viz., at about the close of the second month of fetal life; the second in the body of the ischium, just below the acetabulum, at about the third month; and the third in the body of the pubes, near the acetabulum, during the

Fig. I.

The Os Innominatum of the right side.

1, the ilium, its external surface; 2, the ischium; 3, the os pubis; 4, the crest of the ilium; 5,6, upper and lower curved lines for attachment of muscles; 7, the surface for attachment of the glutæus maximus; 8, 9, the anterior superior and inferior spinous processes; 10, 11, the posterior spinous processes; 12, the spine of the ischium; 13, 14, the greater and lesser sacro-ischiatic notches; 15, the tuberosity of the ischium; 16, its ramus; 17, the body of the os pubis; 18, its ramus; 19, the acetabulum; 20, the thyroid or obturator foramen.—(From Wilson.)

fourth or fifth month. At birth, the crest of the ilium, the bottom of the acetabulum, and the rami of the ischium and pubes, are still cartilaginous. At about the sixth or seventh year, these rami become completely ossified; next, the ilium is united to the ischium; and lastly, the pubes is joined to the other two in the acetabulum. The complete ossification of the bone, from the secondary centres in the crest of the ilium, the tuberosity of the ischium, etc., is not completed till about the 25th year.

Each os innominatum articulates with its fellow of the opposite side (through the intervention of the *interosseous fibro-cartilage*, which unites the two surfaces of the pubic

bones, see fig. II. *f*), with the sacrum, and with the femur (at the acetabulum). No less than 35 muscles are attached to this bone, some proceeding to the region of the back, others forming the walls of the abdomen, others forming the floor of the P., others passing downward to the lower

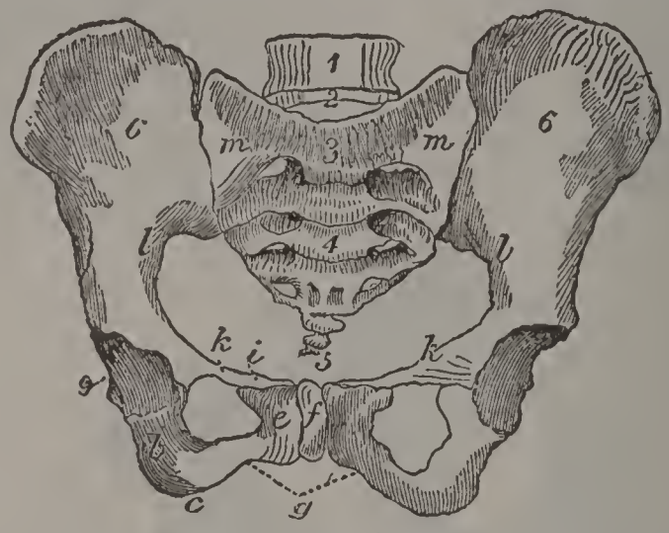


Fig. II.

Pelvis (with Fifth Lumbar Vertebra) of European Female Adult. Transverse diameter, 5·7; antero-posterior diameter, 4·5 inches.

1, the last lumbar vertebra; 2, the inter-vertebral substance connecting it with the sacrum; 3, the promontory of the sacrum; 4, its anterior surface; 5, the coccyx; 6, 6, the iliac fossæ; 9, the acetabulum; *c*, the tuberosity, and *b* the body, of the ischium; *e*, the os pubis; *f*, the symphysis pubis; *g*, the arch, *i*, the spine, and *k* the pectineal line of the pubis; *k*, *l*, *k*, *l*, the ileo-pectineal lines.—(From Humphry.)

extremities, etc. As the other bones entering into the formation of the P., the sacrum, and the coccyx, belong essentially to the vertebral column (see that title), it is sufficient here to remark that, collectively, they form a triangular bony mass (with the base upward, and with a concave anterior surface), which constitutes the posterior part of the pelvic ring. See fig. II. 4, 5.

The P., as a whole, is divisible into a false and true P. The *false pelvis* is all that expanded portion bounded laterally by the iliac bones, and lying above the prominent line termed the *linea ileo-pectinea* (see fig. II. *k*, *l*); while the *true pelvis* is all that part of the general pelvic cavity below that line. The broad, shallow cavity of the false P. serves to support the weight of the intestines; while the rectum, bladder, and part of the generative organs, lie in the cavity of the true P. The upper aperture of the true P. is termed the *inlet*. It is somewhat heart-shaped in form, and has three principal diameters—an *antero-posterior* (or sacro-pubic), which extends from the angle formed by the sacrum with the last lumbar vertebra, to the symphysis pubis, or point of union of the two pubic bones; the *transverse*, at right angles to the former, and extending across the greatest width of the P.; and the *oblique*, extending from the sacro-iliac symphysis (or union), on one side, to the margin of the brim corresponding with the acetabulum, on the other. The diameters of the outlet are two—an *antero-posterior*, extending from the tip of the coccyx to the lower part of

the symphysis pubis; and a *transverse*, from the posterior part of one ischiatic tuberosity, to the same point on the opposite side. As the precise knowledge of the diameter and depth of the pelvis is of the greatest importance in the practice of midwifery, we give the average numbers representing the dimensions of a well-formed adult female pelvis. *Diameters of inlet or brim*—antero-posterior, 4.4 inches; transverse, 5.4 inches; oblique, 4.8 inches. *Diameters of outlet*—antero-posterior, 5 inches; transverse, 4.3 inches. *Depth of the true pelvis—posteriorly*, 4.5 inches; in the middle, 3.5 inches; anteriorly, 1.5 inches.

The pelvis is placed obliquely with regard to the trunk of the body, the plane of the inlet to the true pelvis forming an angle of 60° to 65° with the horizon. The extremity of the coccyx is in the female, when standing upright, about seven lines higher than the lower edge of the symphysis pubis; the upper edge of the symphysis being at the same level as the lower edge of the second segment of the coccyx. By attention to these data, a detached pelvis may readily be placed at the angle at which it normally lies in the skeleton. The shape of the human pelvis is much affected by the curving forward of the lower part of the sacrum. This bend of the sacrum forward serves to support the viscera, when the body is in erect posture; but it is of much more importance in its relation to the act of parturition. If all the antero-posterior diameters of the true pelvis from the brim to the outlet were bisected, the points of bisection would form a curved line, similar to the curve of the sacrum, and termed the *axis* of the pelvis. As the head of the child has to follow this curve, the difficulties of parturition are much greater than if the axis of the pelvis had been straight, as in the other vertebrata. Without entering into unnecessary details, we may remark generally, that the fetal head is of oval shape, with its greatest diameter from before backward, and that in its passage through the pelvis it is so placed that its longest diameter at each stage of labor coincides with the longest diameter of the pelvis. The head usually enters the pelvis with the occiput (or back of the skull) directed toward one ilium, and the face toward the other; at its final emergence, the face is turned toward the sacrum and coccyx.

There are well-marked differences, chiefly having reference to the act of parturition, between the male and female pelvis. In the female, the bones are lighter and more delicate than in the male, and the muscular impressions and eminences are less distinctly marked. The iliac fossæ are large and expanded; hence the great prominence of the hips. The several diameters (particularly the transverse diameter of the brim, which measures only 5.1 inches in the male) are somewhat greater; and the pubic arch is wider by about ten degrees; the sacrum also is wider and less curved.

It is worthy of notice that a negro's pelvis is smaller.

in all its dimensions than that of the European, and presents a partial approximation to that of the monkey (fig. III.), especially in the deficiency of its width. This difference is very much more obvious in the male than in the female negro; and parturition in the black races is facilitated both by the sacrum being less curved, and by the fetal head being of smaller dimensions. In the apes and monkeys, which approach most nearly to man, the P. is longer and narrower, and much less curved than in the human subject. In other mammals, the differences are for the most part the same in kind, but greater in degree. In many of the Cheiroptera (bats) and Insectivora (as the mole), the pubic bones are connected only loosely by a small ligament, or there is a complete opening between the bones (as occurs normally in birds), an arrangement by which the act of parturition in these animals is much facilitated. The pelvic bones are very simple in the Cetacea, in some cases being represented by two simple elongated bones lying near the anus, and converging from opposite sides (a transverse connecting piece being sometimes but not always present); in others, by a small V-shaped bone, while sometimes (as in Manatus) they seem entirely wanting. For the additional pelvic bones in the non-placental mammals, see MARSUPIATA: MONOTREMATA. In the echidna (belonging to the latter order), the acetabulum is perforated, as occurs normally in birds. In birds, in addition to the peculiarity above noticed, we find the P. open in front (or, more correctly, inferiorly), there being no union of the pubic bones in any bird except the ostrich. This normal incompleteness of the pelvic ring is obviously for the purpose of facilitating the passage of the eggs. It is unnecessary to trace the further degradation of the pelvic bones in the reptiles and fishes.

Fig. III.

Pelvis, with two Lumbar Vertebræ, of a large Monkey. Transverse diameter, 2·7, and antero-posterior diameter, 3 inches.—(From Humphry.)

PEMBA, *pĕm'ba*, called *Green Isle* by the Arabs: island about 20 m. off the e. coast of Africa, in the dominions of the Sultan of Zanzibar, lat. 5° s.; length about 38 m. It is an irregular coralline island, cut in every direction by creeks, formerly much frequented by craft engaged in the slave trade. The vegetation is most luxuriant, but P. is unhealthful. Pop. 40,000.

PEMBERTON, *pĕm'bėr-ton*, JOHN CLIFFORD: 1814 Aug. 10—1881, July 13; b. Philadelphia. He graduated from West Point, 1837, served in the Seminole war, and was brevetted captain and major for services in the Mexican war. He was promoted captain 1850, was stationed at Fort Leavenworth during the Kansas troubles, and took part in the expedition to Utah 1858. On the opening of the civil war he resigned from the army and entered the Confederate service. By various promotions he reached the rank of lieutenant-general. He held many important positions, and was in command at Vicksburg when it was besieged by Gen. Grant. After the war he spent several years in Virginia, but returned to Pennsylvania 1876. He died at Penllyn, near Philadelphia.

PEMBERTON, MAX: English novelist: b. Birmingham, England, 1863, June 19. He was educated at Cambridge and was one of the staff of *Vanity Fair* in 1885. He was editor of *Chums*, a boys' paper, 1892–3, and became editor of *Cassell's Magazine* in 1896. He has published *The Iron Pirate* (1894); *Sea Wolves* (1894); *The Impregnable City*, (1895); *The Little Huguenot; A Puritan's Wife* (1896); *A Gentleman's Gentleman* (1896); *Christine of the Hills* (1897), a novel of Dalmatian life, one of his best works; *The Garden of Swords* (1899); *The House Under the Sea* (1902); *The Gold Wolf* (1903); *Dr. Xavier* (1903); *Red Morn* (1904); *Beatrice of Venice* (1904); *'Mid the Thick Arrows* (1905), etc.

PEMBROKE, *pĕm'brōk:* seaport of S. Wales; market-town, and municipal and parliamentary borough, in the county of Pembroke, on a rocky ridge on a navigable creek of Milford Haven, 7 m. s.e. of Milford. On the extremity of the ridge are the remains of its anciently extensive castle, said to have been the birthplace of Henry VII. Beneath the ruins is a remarkable natural cavern. In 1648 the castle was beleaguered by Cromwell, and taken after a siege of six weeks. *Pater*, otherwise called Pembroke Dock, rather a ship-building than a commercial centre, is 2 m. from the town, and has several building-slips and a dry-dock. The naval establishment of the government covers 80 acres, and is surrounded by a high wall, flanked by fortifications. Pop. (1901) 15,853.

PEM'BROKE, EARLS OF. See HERBERT (Family).

PEM'BROKE COLLEGE Cambridge: one of the colleges of Cambridge Univ. England, founded 1347 by Mary de St. Paul widow of Aymer de Valence, Earl of Pembroke. She was maid, wife, and widow all in one day, her husband being slain at a tilting-match held in honor of her nuptials. On this sad event, she bequeathed her estate to pious uses. There are 13 fellowships and 29 scholarships of different values.

PEM'BROKE COLLEGE, Oxford: one of the colleges of Oxford Univ., England. Originally, it was BROADGATES HALL, a place of education belonging in part to St. Frydeswyde's Priory, in part to the monastery of Abingdon; and on the dissolution of the religious houses, it was given to Christ Church by Henry VIII. In 1629 it was made a college by James I., and took its name from the Earl of Pembroke, then chancellor of the univ. The constitution of P. C. is now as follows: There are to be not less than 10 fellowships, open to all, not to exceed £200 a year in value, so long as the number of the fellowships is less than 16. There are to be not less than 12 incorporated scholarships. There are at present 24, tenable for 5 years —except the Townshend scholarships, tenable for 8 years—the holders, however, sharing in the emoluments during only four years. This college presents to 8 benefices, of which 6 have been purchased since 1812.

PEMBROKESHIRE, *pĕm'brûk-shêr*, or PEM'BROKE: maritime county of S. Wales, westernmost county of the principality; bounded s. by the Bristol Channel, w. and n. by St. George's Channel, e. and n.e. by Cardigan and Carmarthen; length, about 30 m., average breadth, about 20 m.; 393,682 statute acres, or 615 sq. m. The river Teivy separates the county from Cardigan on the n.e. On the n. are Newport and Fishguard Bays, the latter 3 m. in width, 30 to 70 ft. deep, with good anchoring-ground. St. Bride's Bay, widest inlet on the western coast, is 10 m. in width, and has an inland sweep of 7 m. Milford Haven (q.v.) is the most important estuary. The shores on the s. are wild and inhospitable, and fronted by high, precipitous cliffs. The surface is undulating; green hills alternate with fertile valleys. The principal elevations occur in the Precelly Hills, which traverse the n. of the county from e. to w.—highest summit 1,754 ft. The rivers are not important; except that the Eastern and Western Cleddau unite and form a navigable portion of Milford Haven. The climate is mild, but damp in the s. of the county; while in the n., the temperature is considerably lower. There are excellent and productive soils in the s., and along the n.w. coasts the barley districts are famous; but the land on the Precelly Mountains and in the coal districts is inferior. Coal, slate, lead, and iron are the only minerals worked. Oats, barley, and potatoes are principal crops. P. is remarkable from the fact that, though the most distant of Welsh counties from England, more than half its surface is inhabited by an English-speaking population: this arose from the settlement of a colony of Flemings here, and their adoption of the English tongue. The district has hence been called Little England beyond Wales. The chief towns are Haverfordwest, St Davids Pembroke, and Tenby. Pop. (1891) 89,125; (1901) 87,910.

PEMMICAN, or PEMICAN, n. *pĕm'mĭ-kăn* [N. Amer. word]: meat, especially venison or beef, cut into thin slices, divested of fat, and dried in the sun and wind: cured meat dried to hardness, then pulverized or pounded into a paste, and mixed with fat and sometimes raisins, and afterward compressed into cakes—used on long journeys of exploration or long voyages. Sometimes a few fruits of *Amelanchier ovata* are added for flavor. P. will keep uninjured a very long time.

PEMPHIGUS, *pĕm'jĭ-gŭs* [Gr. *pemphix*, blister; *pemphigos*, of a blister], or POMPHOLYX, *pŏm'fō-lĭks:* one of the skin-diseases, characterized by eruption of large vesicles filled with serous fluid, and known as *bullæ*. The disease occurs both in acute and in chronic form. In a mild case of acute P., bullæ, or blisters, from the size of a pea to that of a chestnut, appear in succession (chiefly on the extremities), and, having continued three or four days, break, form a thin scab, and soon heal, unaccompanied with febrile or inflammatory symptoms. In severe cases there is considerable constitutional disturbance; the bullæ are larger, and the scabs heal with difficulty. The chronic form differs mainly from the acute by its prolonged continuance. The acute variety affects children chiefly, and has been ascribed to dentition, errors of diet, etc.; while the chronic form attacks mostly aged persons, and is due probably to debility and impaired nutrition. The acute form usually requires nothing but cooling medicines and diet, and mild local dressings, e.g., simple cerate, to protect the raw surfaces from exposure to the air. In the chronic form, a nutritious diet, with judicious use of tonics (iron, bark, etc.), is commonly successful. In obstinate cases, physicians sometimes prescribe arsenic.

PEN, n. *pĕn* [F. *penne*, a feather, a pen—from L. *penna*, a feather: It. *penna*, see further below]: instrument for writing, formerly almost always a quill, now commonly of metal (see below): V. to write; to compose and commit to paper; to indite. PEN'NING, imp. PENNED, pp. *pĕnd*. PENMAN, n. *pĕn'măn* [*pen* and *man*]: a writer; one who teaches writing. PEN'MANSHIP, n. manner or art of writing. PEN'NER, n. *-nẽr*, one who writes with a pen. PEN-CUTTER, one who makes pens; also an instrument for making pens. PEN-FISH, a kind of eelpout without a smooth skin. PENKNIFE, a small jointed and cased knife for the pocket. PEN AND INK, literary; in writing; applied to a sketch or outline drawn with a pen. PEN HOLDER or CASE, instrument for holding a pen or nib when writing, usually of cedar-wood, and made by machinery.

PEN, n. *pĕn* [AS. *pyndan*, to pound or shut up; *pund*, a pound or inclosure (see POUND 2)]: a small inclosure for sheep, fowls, etc.; a coop; a reservoir for water: V. to confine in a pen or in a narrow place; to coop; to incage. PEN'NING, imp. PENNED, pp. *pĕnd*, followed by *up*, shut up in their pen, as poultry. PENT, pp. *pĕnt*, confined or crowded into a narrow space.

PEN: instrument for writing with a fluid. In ancient times a kind of reed (Lat. *Calamus*) was used, though sometimes the letters were painted with a fine hair-pencil, as among the Chinese at the present day. Quill-pens (see QUILLS) came into use probably after the introduction of modern paper. The English name pen is from Lat. *penna*, a feather; but the old form of *penna* was *pesna* or *petna* (= Gr. *peteron*), from the root *pet*, to fly; and just as Lat. *ped* is identical with Eng. *foot* (see letter F), so *petna* or *peteron* corresponds to *feather* (Ger. *feder*). During the 18th c. many efforts were made to improve the quill-pen, the great defect of which was its speedy injury from use, and the consequent trouble of frequent mending; moreover, even the most skilful maker could not insure uniformity of quality, and any variation affected the writer's work. These efforts were chiefly to fit small metal or even ruby points to the nib of the quill-pen; but the delicacy of fitting was so great, that but very little success attended the experiments. At the beginning of the 19th c. pens began to be made wholly of metal; they consisted of a barrel of very thin steel, and were cut and slit to resemble the quill-pen as closely as possible. They were inferior and expensive (retail price at first half a crown, abt. 62 cents); their chief fault was hardness, which produced disagreeable scratching of the paper. In 1820, Joseph Gillott made an improvement, removing this great defect, and developing the manufacture to a marvellous extent. This consisted in making three slits instead of the single one, gaining much greater softness and flexibility. Gillott also introduced machinery, so reducing the cost that he was enabled to sell his improved pens 1821 at £7 4*s*. (about $35) per gross, then considered remarkably cheap. Better pens are now sold at twopence (4 cents) per gross by the same

manufacturer; in other words, 864 pens for the same price as one pen in 1821. The lowest-priced pens are made almost entirely by machinery, but the better ones require much hand-labor for their completion; nevertheless, in the works of Mr. Gillott alone, who is only one of several large manufacturers in Birmingham, England, the annual production is now nearly 150,000,000 pens, requiring a supply of five tons per week of the fine sheet-steel made for the purpose in Sheffield, a portion of which is returned as scrap or waste for remanufacture.

There are (1890, Dec.) 23 factories in the world employed in making steel pens: 13 in Birmingham, Eng.; 4 in France; 1 in Germany; 5 in the United States. The steel from which the best metallic pens are made is produced in Sheffield, and from there the United States is supplied, the Sheffield steel being regarded as by far the best in the market. Nearly 25 tons of *pen-steel* are used in the world every week, giving a production of about 30,000,000 pens a week.

In the process of manufacture, the sheets of steel are cut into strips; then rolled until they attain a uniform thinness of $\frac{1}{24}$ to $\frac{1}{32}$ of an inch, according to the kind of pen wanted. These cuttings are packed in iron pots, sealed with clay, air-tight, and placed in the *muffle*, or closed furnace, where they are heated until all the temper is taken from the steel. The first mechanical operation is *cutting the blank*. This is effected with the aid of a screw-press, when, with a scissors-like action, a *punch* cuts from the strip of plate-steel the properly shaped *blank*. The *annealing* follows. The blanks are put into iron boxes, sent to the furnace, and when properly heated are set aside to cool gradually. The *stamping*, or marking, is the next step, and is accomplished by letting a steel die fall upon the little piece of metal, thereby giving the proper marking. The *piercing* or *perforation*, which gives the necessary elasticity to the pen, and also enables it to hold the ink, is a very important process, and the tools for its accomplishment are very delicate. The punch and bed having been fixed in a screw-press of the finest adjustment, the blow is given that makes a clean-cut hole, of an oblong shape. The *raising*, a technical name for bending, is the next process. One pen is taken at a time, and passed into the machine, where the proper curvature of the metal is given. When enough are ready for the hardening process, they are put into sheet-iron barrels, which are made to revolve over a slow fire until the pens acquire a proper temper. Brittleness has now given place to pliability, but the pens are black in color and scratch at the points. They are immersed in a bath of dilute sulphuric acid, and thereby cleansed; after which they are scoured. This is accomplished by putting them into galvanized iron barrels with sawdust mixed with a fine pebbly material. The cylinders being set in motion, the scouring, or polishing, is effected, and finished in a second receptacle, where the final silvery brightness is acquired, and the points attain their necessary smoothness. The *grinding*, noticeable in

certain portions of the finished pen, is done usually by girls. The pen is delicately touched to a *bob*, or *glazer*, revolving at high speed. It is a circular piece of alder-wood, about ten inches in diameter and a half an inch in width. Round it a covering of leather, dressed with emery, is fixed. This process finished, the *slitting* of the pen is entered upon. The tools are two oblong pieces of steel with edges as delicate as those of a razor. They are so adjusted that in the working of the machine the upper knife descends and meets the lower, and the process of slitting is completed.

A critical assorting is then had, and every pen not absolutely perfect is rejected. The final stage in the manufacture is the *coloring* and *varnishing*. The gray color noticeable on certain brands is produced by placing them in iron cylinders with a quantity of small quartz, pebbly material. These are kept revolving until the bright steel is slightly roughed. They are then immersed in a bath of shellac varnish, being afterward dried and stoved. The completed pens, being now ready for use, are packed in boxes and packets.

In 1905, according to official information, there were but 15 steel-pen establishments in the United States. The following tabulation of sworn statements will be of interest:

Number of steel-pen establishments	15
Amount of capital invested	$575,788
Number of employes	663
Amount of wages paid	$204,778
Value of material	$103,005
Value of product	$473,847

In 1905 there were five manufactories: two in N. J., one in Ohio, one in N. Y. and one in Penn. Two of the establishments were started in consequence of the passage of the tariff act. There are also several agencies for the exclusive presentation of English goods.

In the manufacture of Gold Pens, the statistics of 1905 were as follows:

Establishments	16
Capital invested	$446,933
Number of employes	309
Amount of wages paid	$225,454
Value of material	$274,235
Value of product	$692,029

Of these establishments 12 were in New York, three in Illinois and one in Rhode Island.

In the manufacture of gold pens, the processes differ materially from those in the making of steel pens. Pure gold or even 18-carat gold, is too soft; spring is lacking in it. The same is true of all gold below 12-carat. From 12 to 18 carat, the alloy has different degrees of temper which may be utilized for the work. The best metal for the purpose of pen-making is 16-carat gold, alloyed with silver and copper. It is the strongest, hardest, most elastic, and springy, and will give the longest 'life' to the pen, and the best satisfaction to the writer.

In the manufacture, the gold is cast into ingots, which

are rolled into strips and cut into pen-shape. The extreme points are carefully *sawed* away for the reception of the iridium, which forms the writing point. The iridium is an extremely hard metal, very bright and close-grained, resembling polished silver, but not so white. The particles for the point of the pen are fastened by melting the gold around them with a blow-pipe. The process is called 'sweating.' The 'point' having been fixed, the remainder of the pen is hardened by a series of hammerings, which, when completed, leave the pen ready for the sawing or slitting process. This is accomplished by a thin, soft, copper saw, without teeth, covered with water and fine emery, and revolving very rapidly. The manufacture of the iridium-pointed pens is very extensive in New York, where first the process is said to have been perfected. The subsequent processes are many and complex, but do not differ materially from those employed in the manufacture of steel pens. There is a popular notion that the best gold pens are pointed with diamonds. This is incorrect. A few of that kind were made many years ago; but they were very expensive, and the discovery of iridium put an end to their manufacture. Diamond-pointed pens are very scarce, and rated only as curiosities.

The fountain-pen is the latest and most noticeable improvement in writing instruments. They supply ink to the pen-point, which is usually of gold, by capillary or other attraction from a fountain in the pen-holder. The first attempts to produce such pens were made as early as the middle of the 19th century, but they were not brought to such a state of perfection as to justify their general use until about the beginning of the present century. The latest improvement is an automatic filler, by means of which the reservoir is replenished by simply dipping the point of the pen into the ink-well and pressing a spring, the ink being drawn into the reservoir by suction.

PENAL, a. *pē'năl* [OF. *penal*—from L. *pœnālis*, penal—from *pœna*, suffering, pain: Gr. *poinē:* It. *penale*]: that punishes; that incurs or inflicts punishment; used as a place of punishment. PE'NALLY, ad. *-lĭ*. PENALTY, n. *pĕn'ăl-tĭ* [OF. *penalité*]: punishment inflicted by law, either on the person or by a money fine; a forfeiture for non-payment or non-compliance; fine or mulct (see below). PAINS AND PENALTIES: see under PAIN. PENAL SERVITUDE, punishment now in Britain substituted for transportation beyond seas, and extending from 5 years to 'for life' of the convict (see CONVICT: TRANSPORTATION). —SYN. of 'penalty': fine; mulct; forfeit; forfeiture; amercement; retribution; punishment.

PENALTY.

PEN'ALTY: sum of money declared by some statute or contract to be payable by one who commits an offense or breach of contract. It is considered as a kind of punishment, and constituting indirectly a motive to the party to avoid the act which induces such a consequence. Many contracts between parties contain a clause that one or other of them who fails to perform his part of the contract will incur a P., i.e., will be liable to pay a fixed sum of money to the other party. In such cases, a distinction is drawn between a liquidated and unliquidated P.; and whether it is of the one kind or the other depends on the language in the contract. If it is a liquidated P., then, when the breach of contract is committed, the party in default must pay that precise sum, neither more nor less; but if it is unliquidated, then he is to pay, not the whole sum, but merely such part of it as corresponds to the injury or damage done, and of which proportion a jury is the sole judge in an action of damages. In statutes, when penalties are declared to follow on certain illegal acts, the sum is sometimes fixed, but in many cases only a maximum sum is stated, it being left to the court or the justices who enforce the P. to decide what is a sufficient punishment for the offense. Sometimes penalties can be sued for only by the parties immediately injured; but, as a general rule, and unless it is otherwise restricted, anybody may sue for the P.; for in an offense against public law, where there is no public prosecutor, any person who chooses may set the law in motion. Accordingly, not only may anybody in general sue for the P., but an inducement is offered by declaring the party who does so to be entitled to the whole or a half of the P. Without such inducement, many offenses would be unpunished. The party who so sues is generally called the informer. Sometimes the P. can be sued for only in the superior courts of law; but in the great majority of instances, the enforcing of penalties is part of the administration of justice before justices of the peace. It is for the justices to fix the amount if they have (as they generally have) a discretion to do so. If it is not paid, the justices may issue a distress-warrant, authorizing a constable to seize and sell the goods of the party to pay the fine; and if there are no goods, then the justices may commit the party to prison as a substitutionary punishment. Sometimes justices have a discretion either to impose a P. or commit the party to prison as an alternative punishment. All these matters depend on the construction of particular statutes.—See DAMAGES.

PENANCE, n. *pĕn'ăns* [OF. *penance*—from L. *pœniten'-tĭă*, penitence]: in Roman Catholic theology, voluntary or imposed and accepted pain or suffering, as punishment by which a repentant sinner manifests his sorrow for sin, and seeks to atone for the sin, and to avert the punishment which, even after the guilt has been remitted, may still remain due to the offense. P. is believed in the Rom. Cath. Church to be one of the sacraments of the New Law. It has relations, both as a sacrament, and as a private personal exercise.

P., in the Rom. Cath. Church is distinguished from repentance, which is simply sorrow for evil doing, accompanied with a purpose of amendment. P. is the fruit or the manifestation of this sorrow, and it is commonly accompanied or expressed by some of those external acts which are natural manifestations of any deep sorrow, either negative, as the neglect of ordinary attention to dress, to the care of the person, to the use of food; or positive, as direct acts of personal mortification and self-inflicted pain, such as fasting, wearing haircloth, strewing the head with ashes, watching of nights, sleeping on a hard couch, etc. Such manifestations of sorrow, common among the eastern races, are frequently alluded to in the Scriptures. In the personal practice of Christians in the early centuries, P. was prominent; and the chief and acknowledged object of the stated Fasts (q.v.), and other works of mortification, was penitential correction, or the manifestation of sorrow for sin.

A still more striking use of P., however, was the disciplinary one: and this, in the Rom. Cath. view, is connected with the sacramental character of penance. Any discussion of this purely theological question would be out of place here; it is enough to state briefly that Rom. Catholics number P. among the Seven Sacraments (q.v.). and believe it to be of direct divine institution (Matt. xvi. 19; xviii. 18; John xx. 21). The *matter* of this sacrament consists, in their view, of the three acts of the penitent—contrition, or heartfelt sorrow for sin, as being an offense against God; confession, or detailed accusation of one's self to a priest approved for the purpose; and satisfaction, or the acceptance and accomplishment of certain penitential works, in atonement of the sin confessed: the *form* of the sacrament is the sentence of absolution from sin pronounced by the priest who has received the confession, and has been satisfied of the penitential disposition of the self-accusing sinner. In all these points, of course, they are at issue with Protestants. It is shown from Tertullian and other writers, that from a very early time persons excluded from the church because of scandalous offenses, especially idolatry or apostasy, murder or adultery, etc., were subjected to certain penitential regulations. The period of penitential probation differed, but in general was graduated according to the enormity of the sin, some going so far in their rigor (see NOVATIAN) as, contrary to the clearly-expressed sense of the church, to carry it even beyond the grave. In the earlier ages, much depended on the spirit of each particular church or

country; but about the 4th c., the public penitential discipline assumed a settled form, which, especially in the Greek Church, is remarkable Sinners of the classes above referred to had their names enrolled; and were (in some churches, after having made a preliminary confession to a priest appointed for the purpose) admitted, with a blessing and other ceremonial, by the bishop to the rank of penitents. This enrolment appears to have been usually on the first day of Lent. The penitents so enrolled were arranged in four grades, called—1. (Gr. *proskl̄aiontes*, Lat. *flentes*) 'Weepers;' 2 (Gr *akroōmenoi*. Lat. *audientes*) 'Hearers;' 3. (Gr. *hypopiptontes*. Lat. *prosternentes*) 'Prostraters;' 4. (Gr. *systantes*, Lat. *consistentes*) 'Standers.' Of these classes, the first were obliged to remain outside of the church at the time of public worship, and to ask the prayers of the faithful as they entered. The second were permitted to enter and to remain in the place and during the time appointed for the Catechumens (q.v.); but, like them, were required to depart before the commencement of the solemn part of the Liturgy (q.v.). The third were permitted to pray with the rest, but kneeling or prostrate, and for them were prescribed many other acts of mortification. The fourth were permitted to pray with the rest in a standing posture, though apparently in a distinct part of the church; but they were excluded from making offerings with the rest, and still more from receiving the communion. The time to be spent in each of these grades at first differed according to times and circumstances, but was afterward regulated by elaborate laws, called penitential canons. Still it was in the power of the bishop to abridge or to prolong it; a power, the exercise of which is connected with the historical origin of the practice of Indulgence (q.v.). Of these four grades, the first two scarcely appear in the Western Church. It is a subject of controversy whether, and how far, this discipline was extended to other than *public* sinners; but it seems certain that individuals, not publicly known as sinners, *voluntarily* enrolled themselves among the penitents. All four grades wore a distinguishing penitential dress, in which they appeared on all occasions of public worship, and were obliged to observe certain rules of life, to renounce certain indulgences and luxuries, and to practice certain austerities. In some churches they were employed in the care of the sick, the burial of the dead, and other of the more laborious works of charity. The penitent, in ordinary cases, could be restored to communion only by the bishop who had excluded him, and this only at the expiration of the appointed time unless the bishop himself had shortened it; but, in case of dangerous illness, he might be restored, with the condition, however, that, if he recovered from the illness, the whole course of P. should be completed. The reconciliation of penitents took place usually in Holy Week, and was publicly performed by the bishop in the church, with prayer and imposition of hands: it was followed by the administration of communion. If any of the clergy were guilty of a crime to which public P. was annexed.

they were first deposed from the rank of the clergy, and then subjected to the ordeal, like the laity themselves. This public discipline continued in force with greater or less exactness in the 5th, 6th, and 7th c., gradually, however, being replaced by semi-public, and ultimately by private P. In the 11th and 12th c. the public P. had entirely disappeared. The nature and origin of *private penance* is a subject of controversy between Rom. Catholics and Protestants; the former contending that it had existed from the first, and that it held the same place even in the ages of public P. for *secret sins* which the public P. did for public offenses. At all events, from the date of the cessation of the public discipline, it has existed universally in the Roman Church. The priest, in absolving the penitent, imposes upon him the obligation of reciting certain prayers, undergoing certain works of mortification, or performing certain devotional exercises. These acts of the penitents are held to form an integral part of the sacrament of penance.

According to Protestants, P. has no countenance whatever from Scripture, and is contrary to some essential principles of the Christian religion; particularly to the doctrine of justification by faith in Jesus Christ alone, on the ground of his complete or 'finished' work; P. being, in fact, founded on a doctrine of—at least—supplementary atonement by the works or sufferings of man—the sinner himself. The outward expressions of humiliation, sorrow, and repentance common under the Jewish dispensation, are regarded as very consistent with the character of that dispensation, in which so many symbols were employed. It is also held, that the self-inflicted austerities, as fasting, sackcloth and ashes, etc., of Jewish and early Christian times, had for their sole purpose the *mortification* of unholy lusts and sinful passions in the people of God; or the expression of sorrow for sin, so that others beholding might be warned of its evil and restrained from it; all which is perfectly consistent with the principles of Christianity, if kept within the bounds of moderation and discretion. But P. in any other view, as a *personal exercise*, is utterly rejected. Arguments founded on the meaning of the two Greek words *metanoeō* and *metameleomai*, both translated in our English version *repent*, are much urged by many Rom. Cath. controversialists—the former being represented as equivalent to the English *Do penance;* but this is condemned by Protestants as inconsistent with the very use of the words in the New Test. itself. That P. began, as a practice, very early in the Christian Church, is not only admitted by Protestants, but alleged in proof of the very early growth of those corruptions which finally developed themselves in the doctrines and practices of the Rom. Cath. Church, and of which Protestants also hold that there are plain intimations in the New Test., not only prophetical, but showing the development of their germs to have already begun during the age of the apostles.

In the discipline of the Prot. churches P. is now unknown. The nearest approach to the Rom. Cath. polity

on the subject was that in use among some of the English Puritans of the 17th c., but particularly in the Church of Scotland during that and the 18th c., when it was common 'to make satisfaction publicly on the Stool of Repentance' (q.v.). It does not seem to have occurred to the Reformers or their more immediate successors in the Prot. churches, that their system of discipline, with its public rebukes and enforced humiliations of various kinds—as the wearing of a sackcloth robe, and sitting on a particular seat in church—was liable to be interpreted in a sense very different from that of a mere expression of sorrow for sin; but the belief is now very general among even the most zealous adherents of their doctrinal opinions, that in all this they adopted practices incongruous with their creed, and in harmony rather with that of the Church of Rome. Nor do they seem to have perceived that Church Discipline (q.v.), in its proper sense, as relating to ecclesiastical rights and privileges, is wholly distinct from the imposition of penalties by churches or church courts. Penitential humiliations, imposed by ecclesiastical authority, are now no more in favor where church discipline is most strict, than where the utmost laxity prevails. The commutation of penalties deemed shameful, for a fine to the poor of the parish, was an abuse once prevalent in Scotland, but never sanctioned by the higher ecclesiastical authorities.

PENANG': see PRINCE OF WALES ISLAND.

PENANG LAW'YERS, *pē-năng':* commercial name for the stems of a species of palm imported from Penang for walking-sticks. They are small and hard, and have a portion of the root-stock attached, which is left to form the handle.

PENARTH, *pĕn-ârth':* important seaport and summer resort in Wales, at the mouth of the Taff river, and connected with Cardiff by rail and steamer. It was made a tidal harbor 1856, and large docks have been constructed at great expense. These docks are connected with the Taff Vale railroad by a branch road 4 m. in length; and vast quantities of coal, coke, and iron are shipped. The church of St. Augustine, the dock offices, and the custom-house are important buildings. Pop. (1881) 6,228; (1891) 12,422.

PENATES, n. plu. *pĕ-nātēz* [L. *Pcnātēs,* the Penates —from *pcnĭtus,* within; *pcnus,* provisions]: the household gods of the an. Romans, worshipped in the inner parts of each dwelling: see LAR.

PENCE, n. *pĕns:* the plu. of PENNY, which see.

PENCHANT, n. *pâng-shâng'* [F.—from *pencher,* to incline; L. *pendco,* I hang]: inclination; decided taste.

PENCIL, n. *pĕn'sĭl* [OF. *pincel;* F. *pinceau,* a pencil—from L. *penĭcil'lus,* a small tail, a painter's brush or pencil—from *peniculus,* a little tail; *penis,* a tail: Sp. *pincel*]: thin strip or thread of plumbago or black lead, or other substance, generaly inclosed in a cover of soft wood, and pointed at one end, used for writing or drawing; small fine brush used in painting: the art of drawing: a collection of rays of light converging to, or diverging from, a single point: V. to write, mark, or sketch with a pencil; to delineate.

PENCIL, in *geomctry:* a set of lines lying in the same plane and meeting at a common point. PEN'CILLING, or PEN'CILING, imp.: ADJ. drawing or marking with a pencil: N. the act of sketching or painting; the work of the pencil or brush; a sketch. PEN'CILLED, or PEN'CILED, pp. *-sĭld:* ADJ. marked or painted with a pencil; having pencils or rays; radiated; in *bot.,* marked with lines as with a pencil, or having the appearance of a hair-pencil. PENCIL OF RAYS, in *optics,* an aggregate or collection of rays of light, radiating from, or converging to, a common point.

PENCIL: instrument for writing, drawing, and painting. Pencils differ as much in their construction as in the uses to which they are applied. Probably the pencil was the first instrument used by artists, and consisted then of lumps of colored earth or chalk simply cut into a form convenient for holding in the hand. With such pencils were executed the line-drawings of Aridices the Corinthian, and Telephanes the Sicyonian, also the early one-colored pictures, or *monochromata,* of the Greeks and Egyptians; but as wet colors began to be used, small, fine-pointed brushes would be required, and we find it recorded that as early as B.C. 4th c. several Greek artists had rendered the art of painting with hair-pencils so famous, that some of their pictures sold for vast sums of money. There are now in use the following kind of pencils: hair-pencils, black-lead pencils, chalk-pencils, and slate-pencils. The first are used for painting or writing with fluid colors, either oil or water, and in China and Japan are employed almost entirely instead of pens for writing; the color used being the black or brown pigment obtained from various species of sepia or cuttle-fish. The manufacture of hair-pencils is of great importance, and requires much care and skill. The hairs employed are chiefly those of the camel, badger, sable, mink, kolinski, fitch, goat, and the bristles of hogs; and

the art of pencil-making requires that these hairs shall be tied up in cylindrical bundles, so nicely arranged that all their naturally fine points shall be in one direction, and that the central one shall project the farthest, and the others in succession shall recede, so that, collectively, the whole shall form a beautifully smooth cone, the apex of which in a sharp point. Black-lead pencils are of graphite or plumbago, which contains no lead whatever in its composition, but is in reality almost pure carbon: see BLACK LEAD. The misnomer is probably owing to the fact, that, previous to the employment of graphite for making pencils, common lead was used, and this was the case even with the 19th c. Consequently, as the plumbago, with its black streak, offered a contrast to the pale one of the lead, it was called in distinction from *lead, black lead.*

The first lead-pencils were made in England about 1560. They were far inferior both in quality and appearance to those of the present day. A vast improvement was effected by the substitution of graphite for lead. For a long period the graphite for this purpose was obtained from the Cumberland mines in England, but large quantities have been found in Siberia, and there are mines in Bohemia, Sweden, and other European countries; in Ceylon, Canada, and at several points in the United States. The Alibert mine in Siberia furnishes the graphite for a famous style of artists' pencils, but a very pure grade is obtained at Ticonderoga, N. Y., and in the mines of Florida. When a very fine grade is used the graphite is sometimes cut in blocks of the proper size and merely inclosed in wood; but in order to secure uniformity of quality it is usually ground to an extremely fine powder, freed from impurities, mixed with a sufficient quantity of clay to give it the required consistency, and made into a solid mass by hydraulic pressure, after which it is cut into the sizes required. The clay used with graphite in making lead-pencils is obtained from Bavaria and Bohemia. Nearly all the wood used in the manufacture of pencils in this country and in Europe is obtained from the cedar-trees of Florida. The logs are made into boards a little more than half as thick as the pencils are to be. These are cut into sticks, some of which are grooved with circular saws. The sticks of graphite are then laid into the grooves, and covered with flat pieces, which are glued to those which are grooved. After the two parts are united the pencils are rounded and polished by machines. They are then stamped with the name of the maker, and with a letter or number to indicate the degree of hardness of the lead. No. 1 is the softest of the numbered pencils, No. 2 being medium, and No. 3 hard. When letters are used, M indicates a medium degree of hardness, SM a soft medium, S a soft, and H a hard grade. Artists' pencils of soft grades are sometimes marked B instead of S. The repetition of a letter indicates a greater degree of the quality for which the

single letter stands. Previous to 1830 all the lead-pencils used in the United States were imported. In that year a small shop for their manufacture was opened in New York. The work was done by hand, and the men took the rough pencils home for finishing. The first large establishment of the kind was erected in New York 1861 by A. W. Faber of Germany, represented, as he had been for several years here, by Eberhard Faber. After the destruction by fire of the works, they were rebuilt on Long Island. No other factory of importance was opened in the United States till 1865, when two large companies were formed. One or two more have since entered the field, but the business is still practically controlled by four or five companies.

Chalk-pencils are made in a similar manner, only that finely-powdered colored chalks, such as are used for crayons, are substituted for the black lead. Previous to pressing and cutting the chalk, it is mixed with a little hot melted wax, which gives it softness and adhesiveness.

Slate-pencils for writing on slate are made either by cutting slate into thin sticks and rounding them, or by cutting it into square slips, and encasing them in wood, as in the case of black lead, etc.

From the highest available statistical information, the production of lead-pencils of all kinds in the United States for 1905 is given in the following table:

Establishments	8
Capital invested	$4,980,820
Employes	3,065
Wages paid	$1,059,076
Value of material	$1,803,534
Value of product	$4,425,896

Of these establishments three were in New Jersey, three in New York and two in Pennsylvania. In 1905 there were 2,225,884 gross of pencils of all kinds made, the value being nearly double that of 1900. The manufacturers own graphite mines and operate saw-mills in Florida and adjacent territory where are located the pine and cedar forests yielding wood for pencil cases.

PEND, n. *pĕnd* [F. *pendre*, to hang—from L *pendĕrĕ*, to hang downward]: in *Scot.*, an arched entrance or passage from a street through a block of buildings into another street, or to the ground or tenements behind—so called from the manner in which arches are built, the stones being in a *pendent* form.

PENDANT, n. *pĕn'dănt* [F. *pendant*, hanging, pending —from L. *pendens* or *penden'tem* hanging down: It. *pendente*]: anything hanging by way of ornament, as an earring; wooden or stone ornament hanging from ceilings, vaults, staircases, timber-roofs, etc. It is sometimes a simple ball, and sometimes elaborately ornamented, and is used chiefly in the later Gothic and Elizabethan styles; streamer or long, tapering piece of bunting hung at the mast-heads of vessels (see PENNANT): a hanging apparatus from the roof for a light-holder, usually ornamental.

PEN'DANTS, n. plu. *-dănts*, in the *fine arts*, two pictures, statues, groups of sculpture, or engravings, which, from their similarity of subject, size, form, etc., can be placed together with regard to symmetry. PEN'DENT, a. *-dĕnt*, hanging; projecting; jutting over. PEN'DENTLY, ad. *-lĭ*. PEN'DENCE, n. *-dĕns*, or PEN'DENCY, n. *-dĕn-sĭ*, suspense; state of being undecided. PENDING, a. *pĕnd'ing*, yet undecided; hanging in suspense; not terminated: Prep. during the continuance of.

PEN'DER, SIR JOHN: Scottish promoter of submarine telegraphy: b. Vale of Leven, Dumbartonshire, Scotland, 1815; d. Kent, England, 1896, July 7. He was educated in the Glasgow high school, entered the counting-house of a Glasgow textile firm and in three years became its manager. He made the business his own under the firm name of J. Pender & Company, and it became one of the most important in the country, meantime accumulating for its owner an immense fortune. In 1856 he joined Cyrus W. Field (q.v.) in his projected enterprise of a submarine cable; held the office of chairman of the Anglo-American Company and risked his entire fortune in furthering the venture. Upon its completion he immediately organized companies to connect Great Britain with other parts of the world, and in 1882 66,000 miles of cable had been laid. He was knighted in 1888, sat in Parliament for Totnes in 1862–6, for the Wick burghs in 1872–85, and 1892–6, at first as a Liberal, and in his last years as a Liberal Unionist.

PENDER, WILLIAM DORSEY: American soldier: b. Edgecombe County, N. C., 1834, Feb. 6; d. Staunton, Va., 1863, July 18. He was graduated from West Point in 1854, engaged in frontier service with promotion to lieutenant in 1858, and in 1861 resigned his commission to enter the Confederate army, where he was appointed captain of artillery. He was engaged in the first battle of Bull Run, and acted as brigadier-general at the battle of Seven Pines. He received the rank of major-general in 1863 in recognition of services at the second battle of Bull Run, Winchester, Harper's Ferry, and Fredericksburg, and while leading his brigade against Seminary Ridge at the battle of Gettysburg, was mortally wounded.

PENDLETON, *pĕn'dl-ton*: Ore., city, county-seat of Umatilla County; on the Umatilla River, and on the Oregon R. & T. Co. and the Washington & C. R. railroad, 35 miles southwest of Walla Walla, Wash. The city was enlarged in 1884 by the addition of 640 acres of the Umatilla Indians' reservation. It is built on both sides of the river, which is here crossed by three bridges. The river affords good water-power for manufacturing; the chief industrial establishments include flour mills, machine shops, woolen mills, and a paper mill. The city has a high school and is the seat of St. Joseph's Academy. The waterworks are under municipal ownership and control. Pop. (1900) 4,406.

PEN'DLETON, Edmund: 1721, Sep. 9—1803, Oct. 23; b. Caroline co., Va. His educational advantages were slight, but he studied law, commenced practice 1744, was appointed justice of the co. 1751, and became a member of the house of burgesses 1752. He opposed the Stamp Act, was elected to the colonial convention 1774, and to the first continental congress. In politics he was strongly opposed to Patrick Henry. For some time he was practically the manager of the affairs of the colony of Va., and when the state govt. was organized he was elected speaker of the house, and was a member of the committee appointed to revise the laws. He was seriously hurt by a fall from his horse 1777, but afterward held important judicial offices and was pres. of the Va. convention which ratified the U. S. constitution. He died at Richmond.

PEN'DLETON, Edmund Monroe, M.D.: 1815, Mar. 19—1884, Jan. 26; b. Eatonton, Ga. He graduated from the South Carolina Medical College 1837, and practiced medicine many years, declining various professorships. By his investigations and discoveries, especially his demonstration of the value of cotton-seed for fertilizing, he rendered invaluable service to the agricultural interests of the country. He was prof. of agri. and hort. in the Univ. of Georgia 1872–77, wrote for medical journals, and published *Scientific Agriculture* 1874, which has been used as a text-book in many schools and colleges. He died at Atlanta, Georgia.

PEN'DLETON, George Hunt: 1825, July 25—1889, Nov. 24; b. Cincinnati; son of Nathaniel G. P. He attended an acad. in Cincinnati, studied at Heidelberg, spent some time in foreign travel, studied law, and commenced practice in Cincinnati. He soon entered political life as a democrat, was elected to the state senate 1853, and was a member of congress 1857–65, serving on important committees. At the beginning of the troubles preceding the civil war he favored a compromise, but finding the plan impracticable gave all his influence in favor of the national govt. He was candidate for vice.-pres. on the democratic ticket with Gen. McClellan for pres. 1864; was a member of the convention of Loyalists at Philadelphia 1866, was defeated for candidate for gov. of O. 1869, and accepted the presidency of the Kentucky Central railroad. He was a member of the U. S. senate 1879–85, and rendered eminent service in introducing and securing the adoption of the Civil Service Reform Bill. He was an unsuccessful candidate for re-election to the senate, and was appointed U. S. minister to Germany 1885, Mar. 23, which office he held till the spring of 1889. He died at Brussels, Belgium.

PENDS D'OREILLES: see Kalispels.

PENDULOUS, a. *pĕn′dū-lŭs* [L. *pendulus*, hanging—from *pendĕō*, I hang downward: It. *pendolo:* Sp. *pendulo*]: hanging; swinging; oscillating; in *bot.*, inclined so that the apex is pointed vertically downward—applied to ovules that hang from the upper part of the ovary. PEN′DULOUSNESS, n. *-nĕs*, or PEN′DULOS′ITY, n. *-lŏs′ĭ-tĭ*, the state or quality of being pendulous. PEN′DULUM, n. *-lŭm* [L. *pendulum;* F. *pendule*]: a weight suspended from a fixed point that it may swing freely from side to side, as in a clock (see below). COMPENSATION PENDULUM (see PENDULUM, below).

PEN′DULUM: in its widest scientific sense, a body of any form or material which, under the action of some force, vibrates about a position of stable equilibrium. In its more usual application, however, this term is restricted in conformity with its etymology to bodies suspended from a point, or oscillating about an axis, under the action of gravity, so that, though the laws of their motion are the same, Rocking-stones (q.v.), magnetic needles, tuning forks, balance wheel of a watch, etc., are not included in the definition.

The *simple* pendulum consists (in theory) of a heavy point or particle, suspended by a flexible string without weight, therefore constrained to move as if it were always on the inner surface of a smooth spherical bowl. If such a pendulum be drawn aside into a slightly-inclined position, and allowed to fall back, it evidently will oscillate from side to side of its position of equilibrium, the motion being confined to a vertical plane. If, instead of being allowed to fall back it be projected horizontally in a direction perpendicular to that in which gravity tends to move it, the bob will revolve about its lowest position; and there is a particular velocity with which, if it be projected, it describes a circle about that point, and is then called a *conical* pendulum. As the theory of the simple pendulum can be very easily

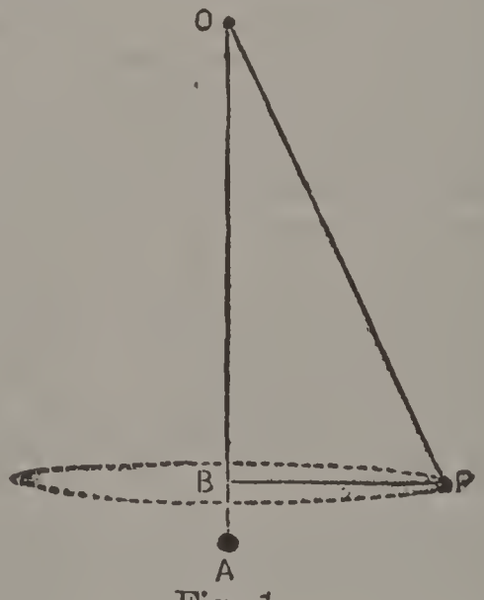


Fig. 1.

explained, by reference to that of the conical pendulum, we commence with the latter, which is extremely simple. To find the requisite velocity, we have only to notice that

the (so-called) Centrifugal Force (q.v.) must balance the tendency toward the vertical. This tendency is not due directly to gravity, but to the tension of the suspending cord. In the fig. let O be the point of suspension, OA the pendulum in its lowest position, P the bob in any position in the (dotted) circle which it describes when revolving as a conical pendulum; PB, a radius of the dotted circle, is evidently perpendicular to OA. Now, the centrifugal force is directly as the radius PB of the circle, and inversely as the square of the time of revolution. Also the radius PB is PO sin. BOP, the length of the string multiplied by the sine of the angle it makes with the vertical; and the force toward the vertical is proportional to the earth's attraction, and to the tangent of the above angle—as may be at once seen from the consideration that the three forces acting on the bob at P are parallel, and therefore proportional, to the sides of the triangle OBP. Hence the square of the time of revolution is directly as the length of the string and the sine of the angle BOP, and inversely as the earth's attraction and the tangent of the same angle; or (what is easily seen to be equivalent) to the length of the string and the cosine of its inclination to the vertical directly, and to the earth's attraction inversely. Hence, in any given locality, all conical pendulums revolve in equal times, whatever be the lengths of their strings, so long as their *heights* are equal; the height being the product of the length of the string by the cosine of its inclination to the vertical. Also the squares of the times of revolution of conical pendulums are as their heights directly, and as the earth's attraction inversely.

Now, *so long as a conical pendulum is deflected only through a very small angle from the vertical,* the motion of its bob may be considered as compounded of two equal simple pendulum oscillations in directions perpendicular to each other, such as it appears to make to an eye on a level with it and viewing it at some distance, first from one point, say on the north, and then from another 90° round, say on the east. And these motions take place, by Newton's second law (see MOTION, LAWS OF), independently. Also the time of a (double) oscillation in either of these directions is evidently the same as that of the rotation of the conical pendulum. Hence, for *small arcs of vibration,* the square of the time of oscillation of a simple pendulum is directly as its length, and inversely as the earth's attraction. Thus, the length of the second's pendulum at London being 39·1393 inches, that of the half-second's pendulum is 9·7848 inches, or one-fourth; that of the two-seconds' pendulum 156·5572 inches, or four times that length. It follows from the principle now demonstrated, that so long as the arcs of vibration of a pendulum are all small relatively to the length of the string, they may differ considerably in length among themselves, without differing appreciably in time. It is to this property of pendulum oscillations known as Isochronism (q.v.), that they owe their value in measuring time: see HOROLOGY.

That the times of vibration of different pendulums are

as the square roots of their lengths, may be demonstrated to the eye by a very simple experiment. Suspend three musket balls on double threads as in figure 2, so that the heights in the dotted line may be as 1, 4, and 9. When they are made to vibrate simultaneously, while the lowest ball makes one oscillation the highest will be found to make three, and the middle ball one and a half.

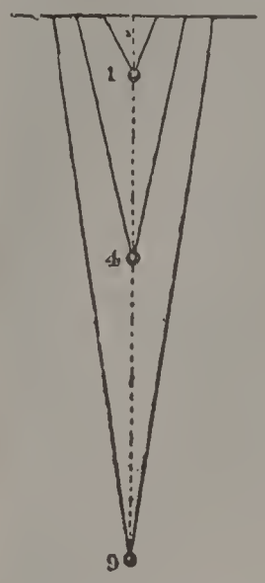


Fig. 2.

A pendulum of *given* length is a most delicate instrument for the measurement of the relative amounts of the earth's attraction at different places. Practically, it gives the kinetic measurement of gravity, which is not only by far the most convenient, but also the true measure. By this application of the pendulum, the oblateness of the earth has been determined, in terms of the law of decrease of gravity from the poles to the equator. The instrument has been employed also to determine the mean density of the earth (from which its mass is directly derivable), by the observation of its times of vibration at the mouth and at the bottom of a coal-pit. It was shown by Newton that the force of attraction at the bottom of a pit depends only on the internal nucleus which remains when a shell, everywhere of thickness equal to the depth of the pit, has been supposed to be removed from the whole surface of the earth. The latest observations by this method were made in the Harton coal-pit, by Airy, English astronomer-royal, and gave for the mean density of the earth a result nearly equivalent to that deduced by Cavendish and Maskelyne from experiments of totally different nature. See EARTH.

If the bob of the simple pendulum be slightly displaced in any manner, it describes an ellipse about its lowest position as centre. This ellipse may, of course, become a straight line or a circle, as in the cases already considered. The bob does not accurately describe the same curve in successive revolutions; in fact, the elliptic orbit just mentioned rotates in its own plane about its centre, in the same direction as the bob moves, with an angular velocity nearly proportional to the area of the ellipse. This is an interesting case of *progression of the apse* (see APSIS), which can be watched by any one who will attach a small bullet to a fine thread; or, still better, attach to the lower end of a long string fixed to the ceiling a funnel full of fine sand or ink which is allowed to escape from a small orifice. By this process a more or less permanent trace of the motion of the pendulum is recorded, by which the elliptic form of the path and the phenomena of progression are well shown.

According to what is stated above, there ought to be no progression if the pendulum could be made to vibrate simply in a straight line, as then the area of its elliptic orbit

vanishes. It is, however, found almost impossible in practice to render the path absolutely straight; so that there always is from this cause a slight rate of change in the position of the line of oscillation. But as the direction of this change depends on the direction of rotation in the ellipse, it is as likely to affect the motion in one way as in the opposite, and is thus easily separable from the very curious result obtained by Foucault, that on account of the earth's rotation, the plane of vibration of the pendulum *appears to turn* in the same direction as the sun, that is, in the opposite direction to the earth's rotation about its axis. To illustrate this now well-known case, consider for a moment a simple pendulum vibrating at the *pole* of the earth. Here, if the pendulum vibrates in a straight line, the direction of that line remains absolutely fixed in space, while the earth turns round below it once in 24 hours. To a spectator on the earth it appears, of course, as if the plane of motion of the pendulum were turning once round in 24 hours, but in the opposite direction. To find the amount of the corresponding phenomenon in any other latitude, all that is required is to know the rate of the earth's rotation about the vertical in that latitude. This is easy, for velocities of rotation are resolved and compounded by the same process as forces, hence the rate at which the earth rotates about the vertical in latitude λ is less than that of rotation about the polar axis in the ratio of sin. λ to 1. Hence the time of the apparent rotation of the plane of the pendulum's motion is $\frac{24 \text{ hours}}{\text{sin. } \lambda}$. At the pole, this is simply 24 hours; at the equator, it is infinitely great, or there is no effect of this kind; in intervening latitudes it varies proportionally.

We have not yet alluded to the obvious fact that a *simple* pendulum, such as is described above, exists in theory only, since we cannot procure either a single heavy particle, or a perfectly light and flexible string. But it is easily shown, though the process cannot be given here, that a rigid body of any form whatever vibrates about an axis under the action of gravity, according to the same law as the hypothetical simple pendulum. The length of the equivalent simple pendulum depends upon what is called the Radius of Gyration (q.v.) of the pendulous body. Its property is simply this, that if the whole mass of the body were collected at a point whose distance from the axis is the radius of gyration, the Moment (q.v.) of inertia of this heavy point (about the axis) would be the same as that of the complex body. The square of the radius of gyration of a body about any axis is greater than the square of the radius of gyration about a parallel axis through the centre of gravity, by the square of the distance between those lines. Now, the length of the simple pendulum equivalent to a body oscillating about any axis is directly as the square of the radius of gyration, and inversely as the distance of the centre of gravity from the axis. Hence, if k be the radius of gyration of a body about an axis through the centre of gravity, $\sqrt{k^2 + h^2}$ is that about a parallel axis

whose distance from the first is h; and the length, l, of the equivalent simple pendulum is $l = \frac{k^2+h^2}{h}$.

This expression becomes infinitely great if h be very large, and also if h be very small (that is, a body vibrates very slowly about an axis either far from, or near to, its centre of gravity). It must therefore have a minimum value. By solving the equation above as a quadratic in h, we find that l cannot be less than $2k$, which is, therefore, the length of the simple pendulum corresponding to the quickest vibrations which the body can execute about any axis parallel to the given one. In this case, the value of h is equal to k. Hence, if a circular cylinder be described in a body, its axis passing through the centre of gravity, and its radius being the radius of gyration about the axis, the times of oscillation about all generating lines of this cylinder are equal, and less than the times of oscillation about any other axis parallel to the given one. Also, since the formula for l, above given, may be thus written, $h(l - h) = k^2$, it is obvious that it is satisfied if $l - h$ be put for h. Hence, if any value l (not less than $2k$) be assigned as the length of the equivalent simple pendulum, there are *two* values of h which will satisfy the conditions; that is, there are two concentric cylinders, about a generating line of either of which the time of oscillation is that of the assigned simple pendulum. When $l = 2k$, these cylinders coincide, and form that above described. And, since the sum of the radii of these cylinders is l, it is obvious that if we can find experimentally two parallel axes about which a body oscillates in equal times, and if the centre of gravity of the body lie *between* these axes, and in their plane, *the distance between these axes is the length of the equivalent simple pendulum.* This result is of great importance: it enabled Kater (the first to employ it) to use the complex pendulum for determination of the length of the simple second's pendulum in any locality. The simple pendulum, though perfect in theory, cannot be constructed; but this method obtains its results.

Compensation Pendulum.—This is a clock-pendulum in which the effects of the changes of temperature on the length of the rod are counteracted by the difference in the expansion of the two or more metals of which it is composed. As the length of a rod or bar of any material depends on its temperature (see HEAT), a clock with an ordinary pendulum goes faster in cold, and slower in hot, weather. Various contrivances have been devised for diminishing, if not destroying, these effects. The most perfect in theory, though perhaps not the most available in practice, is that of Sir D. Brewster (q.v.), founded on the experimental discovery of Mitscherlich, that some crystals *expand* by heat in one direction, while *contracting* in the perpendicular one; therefore, that a rod may be cut out of the crystal in such a direction as not to alter in length by change of temperature. In

the method of correction usually employed, called *compensation*, advantage is taken of the fact that different substances have different coefficients of linear dilatation; so that if the bob of the pendulum be so suspended as to be raised by the expansion of one substance, and depressed by the expansion of another, the lengths of the effective portions of these substances may be so adjusted that the raising and depression, taking place simultaneously, may leave the position of the bob unaffected. There are two common methods of effecting this, differing a little in construction, but depending ultimately on the same principle. Of these, the *mercurial* pendulum is the more easily described. The rod AC, and the framework CB, are of steel. Inside the framework is placed a cylindrical glass jar, nearly full of mercury, which can be raised or depressed by turning a nut at B. By increase of temperature, the steel portion AB is lengthened by an amount proportional to its length, its coefficient of linear dilatation, and the change of temperature, conjointly—and thus the jar of mercury is removed from the axis of suspension. But neglecting the expansion of the glass, which is very small, the mercury rises in the jar by an amount proportional to its bulk, its coefficient of cubical dilatation, and the change of temperature, conjointly. Now, by increasing or diminishing the quantity of mercury, it is obvious that we may so adjust the instrument that the length $\left(\frac{k^2}{h}\right)$ of the equivalent simple pendulum shall be unaltered by the change of temperature, whatever be its amount, so long as it is not great enough to sensibly change the coefficients of dilatation of the two metals. The screw at B has nothing to do with the *compensation;* its use is to adjust the length of the pendulum so that it shall vibrate in one second.

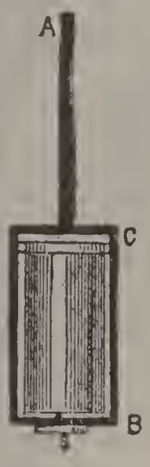


Fig. 3.

The construction of the *gridiron* pendulum will be understood from the cut. The black bars are steel, the shaded ones are brass, copper, or some substance whose coefficient of linear dilatation is more than double that of steel. It is obvious from the figure that the horizontal bars are merely connectors, and that their expansion has nothing to do with the vibration of the pendulum—so they may be made of any substance. It is easily seen that an increase of temperature lowers the bob by expanding the steel rods, whose effective length consists of the sum of the lengths of A*a*, BC, and the steel bar to which the bob is attached; while it raises the bob by expanding the brass bars, whose effective length is that of one of them only; the other, as well as the steel rod *bc*, being added to the instrument for symmetry, strength, and stiffness only. If the effective lengths of steel and brass be inversely as their respective dilatation coefficients, the position of the bob is unaltered by temperature; therefore the pendulum will vibrate in the same period as before heating. This is on the sup-

position that the weight of the framework may be neglected in comparison with that of the bob; if this weight must be taken into account, the requisite adjustments, though possible, are greatly more complex, and can only be alluded to here. Practically, it is found that a strip of dry fir-wood, carefully varnished, to prevent the absorption of moisture, and consequent hygrometric alterations of its length, is very little affected by change of temperature; and, in many excellent clocks, this is used as a very effective substitute for the more elaborate forms just described. To give an idea of the nicety which modern astronomy requires in the construction of an observing clock, we may mention that the Russian astronomers find the gridiron superior to the mercurial pendulum; because differences of temperature at different parts of the clock-case (though almost imperceptible in a properly protected instrument) may heat the steel or the mercury unduly in the latter; while, in the former, the steel and brass bars run side by side through the greater part of the length of the pendulum, and are thus simultaneously affected by any such alterations of temperature.

Fig. 4.

It would lead us into details of a character far too abstruse for the present work to treat of the effects of the hydrostatic pressure and viscosity of the air upon the motion of a pendulum.

PENEDO, *pā-nā′dō:* flourishing town of Brazil, province of Alagoas, near the mouth of the San Francisco. Pop. 9,000.

PENELOPE, *pē-nĕl′ō-pē,* in Homeric Legend: wife of Ulysses (Odysseus), and mother of Telemachus, who was still an infant when Ulysses went to the Trojan war. During the long wanderings of Ulysses after the fall of Troy, he was generally regarded as dead; and P. was vexed by the urgent suits of many lovers, whom she put off on the pretext that she must first weave a shroud for Laertes, her aged father-in-law. To protract the time, she undid by night the portion of the web which she had woven by day. When the suitors had discovered this device, her position became more difficult than before; but fortunately Ulysses returned in time to rescue his chaste spouse from their distasteful importunities. Later tradition represents P. in a very different light, asserting that by Hermes (Mercury), or by all her suitors together, she became mother of Pan (q.v.), and that Ulysses, on his return, divorced her in consequence. But the older Homeric legend is the simpler and more genuine version.

PENEL′OPE CRISTA′TA: see GUAN.

PENETRATE, v. *pĕn'ĕ-trāt* [L. *penetrātus*, entered or pierced into—from *penĕtro*, I pierce into: It. *penetrare*: F. *pénétrer*]: to pierce or enter; to pass into the interior; to affect the mind or feelings: to understand; to reach or to find; to make way. PEN'ETRATING, imp.: Adj. having the power to enter; sharp; piercing; quick to understand; acute. PEN'ETRATED, pp. PEN'ETRA'TION, n. *-trā'shŭn* [F.—L.]: the act of entering; acuteness; discernment. PEN'ETRABLE, a. *-tră-bl* [F. *pénétrable*—from L. *penetrabilis*, that can be pierced]: that may be penetrated or pierced; susceptible of moral or intellectual impressions. PEN'ETRABLY, ad. *-blĕ*. PEN'ETRABIL'ITY, n. *-bĭl'ĭ-tĭ*, the susceptibility of being entered or passed through by another body. PEN'ETRA'LIA, n. plu. *-trā'lĭ-ă* [L.]: interior parts; hidden things or secrets. PEN'ETRANT, a. *-trănt*, having power to enter or pierce. PEN'ETRANCY, n. *-sĭ*, the power of entering or piercing. PEN'ETRATINGLY, ad. *-lĭ*. PEN'ETRATIVE, a. *-trātĭv*, that pierces; having the power to impress the mind; sharp, acute. PEN'ETRATIVELY, ad. *-lĭ*. PEN'ETRATIVENESS, n. *-nĕs*, the quality of being penetrative.—SYN. of 'penetration': sagacity; discrimination; sharpness; judgment; discretion.

PENFIELD, FREDERIC COURTLAND, A.M.: American diplomat: b. Connecticut, 1855, April 23. He studied in Germany, entered journalism and was for five years on the editorial staff of the Hartford *Courant*. In 1885 he was appointed United States vice-consul-general at London, and in 1893–7 served as diplomatic agent and consul-general to Egypt. He has been honored by various foreign societies and has received decorations from different European governments. He has published: *Present Day Egypt* (1899); *Mahmoud Pasha* (1903); *East of Suez* (1907); etc.

PENFIELD, SAMUEL LEWIS: American mineralogist: b. Catskill, N. Y., 1856, Jan. 16; d. South Woodstock, Conn., 1906, Aug. 12. He was graduated from the Sheffield School at Yale in 1877, and till his death was professor of mineralogy in that institution. He was a member of the National Academy of Science, and an extensive contributor on the subjects of mineralogy and crystallography in the *American Journal of Science and Art*. He was one of the leading authorities on mineralogy in the United States. He published *Brush-Penfield Determinative Mineralogy and Blow-Pipe Analysis* (1898); *Contributions to Mineralogy and Petrography from the Laboratories of the Sheffield Scientific School* (with L. V. Pirsson, 1901); and many papers in the *American Journal of Science and Art*.

PENFIELD, WILLIAM LAWRENCE: American lawyer: b. Dover, Lenawee County, Mich., 1846, April 2. He was graduated from the University of Michigan in 1870, taught for two years at Adrian College, Mich., and in 1872 was admitted to the bar. He then took up the

practice of law in Auburn, Ind., and in 1876 became city attorney. In 1884 he was a member of the Republican State committee; in 1888 presidential elector and electoral messenger, and delegate to the National Convention in 1892. He was judge of the 5th circuit court of Indiana 1894–7 and solicitor of the United States department of state 1897–1905. He has been counsel for the United States in international arbitration cases of the United States against San Domingo, Peru, Haiti, Nicaragua, Guatemala, and Salvador, securing awards for the United States which have amounted to over $2,000,000. He was also appointed to represent the United States before The Hague permanent arbitration court in the controversy with Mexico over the 'Pious Fund Claim of the Californias,' this being the first case to be tried before this tribunal. In 1903 he was counsel for the United States and Venezuela in the Venezuelan arbitration before The Hague tribunal, in 1905 was special commissioner to Brazil, and in 1907 agent and counsel for the United States in arbitration with Nicaragua.

PENGUIN, n. *pĕn'gwĭn* [F. *pinguin*, or *pingouin*, which has been said to come from L. *pinguis*, fat, plump —more probably a word of S. Amer. origin]: a sea-fowl with short wings, incapable of flight, found in the southern seas: a W. Indian fruit, *Bromēlĭă pinguin*, ord. *Bromel'ĭācĕœ*, used as a vermifuge in the W. Indies. *Note.*—PENGUIN has a striking resemblance to W. *pen-gwen*—from *pen*, head, and *gwen*, white; the head of the penguin, however, is 'black,' not 'white.' This difference may be accounted for by supposing that the name was transferred from some similar bird which had a white head—see Skeat.—*Penguin* (*Aptenodytes*) is a genus of birds of family *Alcidœ* (see AUK), or constituting the family *Aptenodidœ*, regarded by many as a sub-family of *Alcidœ*, and divided into several genera or sub-genera. They have short wings, quite unfit for flight, but covered with short rigid scale-like feathers, admirably adapted for swimming, and much like the flippers of turtles. The legs are very short, and are placed very far back, so that on land penguins rest on the tarsus, which is widened like the sole of the foot of a quadruped, and maintain a perfectly erect posture. Their bones, unlike those of birds in general, are hard, compact, and heavy, and have no air-cavities; those of the extremities contain an oily marrow. The body is of an elliptical form; the neck of moderate length; the head small; the bill moderately long, straight, more or less compressed; the tail very short. Some have a long, slender, and pointed bill, the upper mandible a little curved at the tip, and feathered for about a third of its length; some, called sometimes Gorfews or Gorfous (*Chrysocoma*), have a stout and pointed bill, a little curved at the tip; some, Sphenisques or Spheniscans (*Spheniscus*), have a straight and compressed bill, irregularly furrowed at the base. All the penguins are among the most aquatic birds, though they

are seldom seen very far out at sea; but it is only in the breeding-season that they spend much time on shore. They are found only in the s. hemisphere, chiefly in high s. latitudes, though some of the species extend into warm regions, as *Spheniscus Humboldtii* to the coast of Peru. Of this species, called *Paxaro niño*, or Child Bird, by the Peruvians, Tschudi states that it is easily tamed, becomes very sociable, and follows its master like a dog, waddling along in a very amusing manner with its plump body and short legs, keeping its balance by motions of its little wings. It has considerable intelligence, and learns to answer to its name. In some of the furthest antarctic regions, penguins are prodigiously numerous, appearing on the shore like regiments of soldiers, or, according to another similitude used by a voyager, like bands of little children in white aprons. They often occupy for their breeding-ground a space of several acres, laid out and levelled and divided into squares, as nicely as if it had been

Penguin (*Aptenodytes pennatis*).

done by a surveyor; while between the compartments they march as accurately as soldiers on parade. The KING P. (*A. Patachonica*), a large species, of the size of the great auk, dark grayish-blue above, white beneath, with a black head and a yellow curved band on the throat, is found in such numbers on some of the sandy antarctic coasts, that Bennett describes one breeding-ground on Macquarie Island as covering 30 or 40 acres, and, to give some notion of the multitudes, speaks of 30,000 or 40,000 birds as continually landing, and as many putting to sea. On many of the antarctic shores the penguins do not flee from nor seem to dread the presence of man, remaining as if stupidly indifferent, even when their companions are knocked on the head; their very indifference, it is said,

suggesting the idea of loneliness and desolation more powerfully than if there were total absence of life. When attacked, however, they often show courage in self-defense, and are ready to run with open bill at an invader. The young are reckoned good eating; the old are said to be black and tough. Penguins make no nest, but lay a single egg in a chosen place on the shore; and the egg is carefully tended both by male and by female. The latter keeps charge of her young nearly 12 months.

PEN'HALLOW, Samuel: 1665–1726: emigrant to Mass. from England 1686, with Charles Morton. He removed to Portsmouth, N. H., and became treasurer of the province, and 1717 chief-justice. He wrote *History of the Indian Wars of New England from* 1703–1726.

PENICIL, n. *pĕn'ĭ-sĭl* [L. *penĭcil'lum*, a roll of dry lint]: a pledget or portion of dry lint for wounds or ulcers; a species of shell. Pen'icil'late, a. *-sĭl'lāt*, pencilled; in *bot.*, consisting of a bundle of short close fibres of diverging hairs; applied to a tufted stigma resembling a camel's-hair pencil, as in the nettle.

PENIKESE' Island. See Elizabeth Islands.

PENINSULA, n. *pē'nĭn'sū-lă* [L. *penin'sŭlă*, a peninsula—from *pene*, almost; *insŭla*, an island: It. *penisola:* F. *péninsule*]: a portion of jutting land almost surrounded by the sea; a name specially applied to Spain and Portugal united. Penin'sular, a. *-sū-lėr*, pertaining to or formed as a peninsula. Penin'sulate, v. *-lāt*, to form into a peninsula. Penin'sulating, imp. Penin'sulated, pp.: Adj. almost surrounded by water.

PENINSULAR WAR, The: sometimes called the War of Spanish (or Portuguese) Independence, a series of important campaigns 1808–13 against Napoleon in the Iberian peninsula, his opponents being the English, Spanish, and Portuguese. Canning was a firm believer in the utilization of aroused national feeling against Napoleon in states invaded by the French. Such a feeling had sprung up in Spain in 1808, when Ferdinand, Prince of Asturias, having received the crown of Spain by the abdication of Charles IV., his father, ceded it to Napoleon, who gave it to Joseph Bonaparte, 1808, June 6. In spite of brave opposition, the French king entered Madrid July 14; but six days later three French divisions were forced to surrender, guerrilla warfare increased in force, and Spain showed the first successful national resistance to Napoleon. But before this, by the aid of Charles IV., when he was still king of Spain, a French army under Junot had entered Portugal, and a Portuguese rising followed that in Spain. The provisional government of the insurgents asked help from England, so that, at the close of the year 1808, the future Duke of Wellington had defeated the French at Roriça and at Vimeiro August 21. Junot by the Convention of Cintra, August 30, had promised to evacuate Portugal;

and, in fine, Canning's policy had proved successful enough to justify itself thoroughly. The campaign in Spain in 1809 was opened by Napoleon himself at Madrid, and all looked gloomy for Spain until July, when Wellington, having dislodged from Portugal a fresh army under Soult, invaded Spain and won the victory of Talavera de la Reina, July 28. The third year of the war (1810) was taken up by the attempts of the French armies to complete their conquest of Spain and to drive Wellington from his fortifications at Torres Vedras; but Masséna was forced early in 1811 to retire from Portugal to Spain. He was pursued and defeated by Wellington at Fuentes de Onoro, 1811, May 5. On May 16 Portugal was again emptied of French troops by Beresford's victory over Soult at Albuera. In central Spain the French suffered from guerrilla attacks and only in the east, where Suchet controlled Valencia and Aragon, were they successful. In 1812, the year that saw the grand army wrecked in Russia, Wellington completely defeated Marmont at Salamanca July 22, and Joseph Bonaparte left Madrid, which was occupied by the English August 12. However, the French held Burgos, and Suchet was still invincible. But the French armies in Spain were weakened by the demands of the German campaign of 1813. Wellington broke communications with Paris, at Vitoria June 21, defeated Jourdan—a victory which left Suchet entirely unprotected and forced him to retire—and August 31 stormed San Sebastian, thus breaking the last vestige of French power in Spain and making his way into France itself. There he was equally successful at Saint Palais February 15 and at Vic-en-Bigorre February 19 and was still maneuvering against Suchet when Napoleon abdicated.

PENIS, n. *pē'nĭs* [L.]: the male organ of generation.

PENITENT, a. *pĕn'ĭ-tĕnt* [OF. *penitent;* L. *pœnĭtens* or *pœnĭtentem,* repenting, ruing—from *pœna,* punishment: It. *penitente*]: sorrowful in heart on account of sins and faults; contrite: N. one who is sorrowful on account of his transgressions: one lying under ecclesiastical censure, but admitted to do penance (q.v.); one who is under the direction of a confessor. PEN'ITENTLY, ad. *-lĭ.* PEN'ITENCE, n. *-tĕns,* sorrow or grief of heart for sins; remorse; contrition. PEN'ITEN'TIAL, a. *-tĕn-shăl,* expressing penitence, or proceeding from it: N. in the *R. Cath. Chh.,* a book treating on the manner and degrees of penance. PEN'ITEN'TIALLY, ad. *-lĭ.* PEN'ITEN-TIARY, n. *-shăr-ĭ,* one who prescribes rules and degrees of penance; one who does penance; a place where penance was done; prison or house of correction for training offenders with a view to their reformation (see PENITENTIARIES: also PRISONS): a secret ecclesiastical office of the court of Rome (see below): ADJ. relating to the rules and measures of penance.—SYN. of 'Penitence': repentence; compunction; contrition; regret; pain.

PENITENTIAL PSALMS: seven of the Psalms of David, so called as being specially expressive of sorrow for sin, and accepted by Christian devotion as forms of prayer suitable for the repentant sinner. They are Psalms vi., xxxii., xxxviii., li., cii., cxxx., and cxliii. according to the Authorized Version, which correspond with vi., xxxi., xxxvii., l., ci., cxxix., and cxlii. of the Vulgate. These Psalms have been set apart from a very early period, and are referred to as such by Origen (Hom. ii. in Leviticum). Pope Innocent III. ordered that they should be recited in Lent. They have a special place in the Roman Breviary, and more than one of the popes attached an indulgence to the recital of them. The most deeply penitential, and the most frequent in use, is Psalm li., or the *Miserere*.

PENITENTIARIES: originally, in England, institutions for reception of women, erring but penitent, in which confinement is purely voluntary. The name has been applied also to prisons under the separate system, having been adopted by the Quakers in Penn. 1786, when they caused the legislature of that state to abolish the punishments of death, mutilation, and the whip, and to substitute solitary confinement as a reformatory process The term P. now in the United States denotes a place of penal servitude, a prison in which criminals are compelled to work. (See CONVICT: PRISONS.) The P. of the first-mentioned kind are known usually as Magdalen Asylums or Female Refuges (see MAGDALENE, MARY). Most of the institutions of this kind in the United Kingdom are associated under the auspices of the Reformatory and Refuge Union, an association which embraces also reformatories, industrial schools, and like institutes. The Union has on its list between 60 and 70 P. or homes for fallen women in England (15 in London), and 12 in Ireland and Scotland. In the Magdalen asylums, the inmates remain in strict seclusion for periods varying from a few months to two years, the average time being about a year; they then return to their friends, or to situations provided for them. It is an invariable rule not to dismiss any, except the entirely incorrigible, without seeing that they are provided with the means of honest subsistence. During their seclusion they are employed in needle-work, washing, and housework. Most of the provincial and metropolitan establishments have been created in recent years. The oldest institution is the London Magdalen Hospital (with room for 140), opened 1758; the next that of Dublin (for 20 persons), in 1766; the Edinburgh Magdalen Asylum (with room for 70), in 1797. All the rest (including a large one at Glasgow, with accommodation for 146) have been founded in the 19th c. During the last hundred years the London Magdalen committee state that they have found from their extensive experience that 70 per cent. are permanently reformed. All the institutions can show a very large percentage restored to their friends and to society.—In the United States there are efficient and useful institutions of this kind; but, as far as now known, they are not associated in a Union.

PENITENTIARY [L. and It. *penitentiaria*]: name given to one of the offices of the Roman court, also to the dignitary (a cardinal called *Penitentiarius*) who presides over it. The cardinal P. must be a priest and a doctor of theol. or canon law. He is named by the pope himself, and should the P. die while the Roman see is vacant, the cardinals must be specially assembled to elect by secret scrutiny a pro-P. to act for the time. The officials of the P., under the cardinal P., are a regent, three secretaries, three clerks, a corrector, a consulter in theol., another in canon law, and one or two minor officers. The subjects which come under the notice of the P. are all matters relating to the confessional, especially the absolution from sins and from canonical censures, reserved to the pope, and in certain cases dispensations from the impediments of marriage.

PENJDEH, *pĕnj-deh*, or PUNJ DEEN, *pŭnj dēn:* oasis in Afghanistan: lat. 36° 4′ n., long. 62° 41′ e.; seat of a Turkoman camp, 130 m. n. of Herat. It is of irregular form, about 27 m. in extreme length and 20 m. in extreme breadth; about 300 sq. m. Its importance is derived from its location in the long-disputed boundary region between England and Russia. Its seizure by the Russians 1885, Mar. 30, led to elaborate preparations for war; but after various conferences a treaty was arranged 1887 by which the Russians were allowed to remain in possession. The people keep large flocks, and are expert in manufactures of cloth and carpets. Pop. about 8,000.

PENMAN and PENMANSHIP: see under PEN 1.

PENN, JOHN: 1729, July 14—1795, Feb. 9; b. London grandson of William P., the founder. After studying at Geneva, he came to Penn., was made a member of the council 1753, was lieut.gov. of the colony 1763–71, gov. 1773–75. He refused to recognize the govt. instituted by the constitutional convention, and claimed to be neutral throughout the revolution. He died in Bucks co., Penn.

PENN, JOHN: 1741, May 17—1788, Sep.; b. Caroline co., Va. After spending a few years at a country school, he entered the law office of Edmund Pendleton as a student, and was admitted to practice 1762. He removed to N. C., was a member of the continental congress, signed the Declaration of Independence, and afterward served two terms in congress. The later years of his life were spent on his estate in N. C.

PENN, JOHN, LL.D.: 1760, Feb. 23—1834, June 21; b. England; grandson of William P., the founder. He studied at Cambridge, and on the death of his father, Thomas P., 1775, became gov. of the colony of Penn., but soon lost his position by the revolution. He returned to England, was a member of parliament, and published a vol. of poems and several other works.

PENN, Richard: 1735–1811, May 27; b. England: bro. of Gov. John Penn, and son of William Penn, the founder. He studied at Cambridge, came to Penn. 1763, returned to England, but came back as lieutenant-governor of the colony 1771, and held the office about two years with great acceptance to the people. He was member of parliament 1796–1806, and returned to Philadelphia 1808, but died in England.

PENN, Thomas: 1702–1775, March 21; b. England; son of William Penn, the founder. He came to Penn. 1732, and was manager of the colony till 1741. He inherited a vast estate, made large contributions to benevolent societies, and founded the Pennsylvania College. When nearly fifty years of age he married a lady of rank in England. He died in London.

PENN, William: English Quaker and philanthropist, founder of the colony of Pennsylvania: 1644, Oct. 14—1718, July 30; b. London; son of Sir William Penn, eminent English admiral (1621–70, b. Bristol, England). His early years were spent partly in Essex and partly in Ireland, where his father had several estates. Penn studied at Christ Church, Oxford, and while there was converted to Quakerism by the preaching of Thomas Loe, a disciple of George Fox. His enthusiasm for his new faith assumed a pugnacious form. Not only did he object personally to attend the services of the Church of England, and to wear the surplice of a student—both of which he considered eminently papistical—but, with some companions who also had become Quakers, he attacked several of his fellow-students, and tore the obnoxious robes from their backs. For this unseemly procedure Penn was expelled from the university. His father was so excessively annoyed at his conduct, that he gave Penn a beating, and turned him out of doors: but he was soon afterward mollified, and sent his son to travel on the continent, in the hope that the gayety of French life would change the bent of his mind. The desired effect did not follow, but the youth acquired a grace and suavity of address that he did not before possess. In 1666 the admiral sent him to Ireland to look after his estates in the county of Cork, which Penn did to his father's complete satisfaction; for in business he was as practical an Englishman as he was an out-and-out mystic in religion. In the city of Cork, however, he again fell in with Thomas Loe, and for attending a Quaker meeting was, with some others, imprisoned by the mayor, but was immediately released on appealing to the lord pres. of the council of Munster, who was personally acquainted with him. On his return to England Penn and his father again quarrelled, because the 'conscience' of the son would not allow him to take off his hat to anybody—not even to the king, the Duke of York, or the admiral himself. Penn was again turned out of doors by his perhaps testy, but assuredly provoked, parent.

The mother, however, conciliated the father so far that Penn was allowed to return home, and the admiral even exerted his influence with the government to wink at his son's attendance at the illegal conventicles of the Quakers, which nothing would induce him to give up. In 1668, however, he was thrown into the Tower, on account of a publication entitled *The Sandy Foundation Shaken*, in which he attacked the ordinary doctrines of the Trinity, God's 'satisfaction' in the death of Christ, and justification by the imputation of Christ's righteousness. While in prison he wrote the most famous and popular of his books, *No Cross, No Crown*, and *Innocency with her Open Face*, a vindication of himself, which contributed to his liberation, which was obtained through the interference of the Duke of York. 1670, Sep., Admiral Penn died, leaving his son an estate of £1,500 a year, together with claims upon government for £16,000. In 1671 the upright but incorrigible sectary was again committed to the Tower for preaching; and as he would not take an oath at his trial, he was sent to Newgate for six months. Here he wrote four treatises; one, entitled *The Great Cause of Liberty of Conscience*, is an admirable defense of the doctrine of toleration. After regaining his liberty he visited Holland and Germany, with Fox and Barclay, for the advancement of Quakerism. The Countess-Palatine Elizabeth, granddaughter of James I., showed him particular favor. On his return, he married, in the beginning of 1672, Gulielma Maria Springett, daughter of Sir William Springett, and for some years thereafter continued to propagate, by preaching and writing the doctrines of his sect. Circumstances having turned his attention to the new world, he, 1681, obtained from Charles II., in lieu of his claim upon him for £16,000 for money loaned by his father, a grant of the territory now forming the state of Pennsylvania. Penn wanted to call it Sylvania, on account of its forests; but the king good-humoredly insisted on the prefix Penn. Penn's great desire was to establish a home for his co-religionists in the distant West, where they might preach and practice their convictions in unmolested peace. With several friends he sailed for the Delaware 1682, Aug.; was well received by the settlers, and held his famous interview with the Indian tribes, under a large elm-tree at Shackamaxon, now Kensington, probably, in 1683. He next planned and named the city of Philadelphia, and for two years governed the colony in the wisest, most benevolent, and liberal manner. Not only Quakers, but persecuted members of other religious sects, sought refuge in his new colony, where, from the first, the principle of toleration was established by law. Having called the colonists together, he gave the infant state a constitution in 24 articles. Toward the end of the reign of Charles II., Penn returned to England to exert himself in favor of his persecuted brethren at home. His influence with James II.—an old friend of his father's—was

so great, that many people then, and some even yet, do not feel quite satisfied about the nature of their relations; but the suspicion that he allowed himself to be used as a tool by the court is really not justified by any known facts. It is a possible suspicion (for his position was equivocal), but it is not proven; and Lord Macaulay—who with ungracious animosity has urged the view of his complicity in some of the disgraceful incidents that followed Monmouth's rebellion—has been fully convicted of haste and inaccuracy in several important particulars. At any event, Penn's exertions in favor of the Quakers were so far successful, that 1686 a proclamation was issued to release all persons imprisoned on account of their religious opinions, and more than 1,200 Quakers were set free. In April, 1688, James issued an edict for repeal of all religious tests and penalties, but the mass of Nonconformists mistrusted his sincerity, and refused to avail themselves of it. After the accession of the Prince of Orange as William III., Penn was twice accused of treason, and of corresponding with the exiled monarch, but was acquitted. In 1690 he was arrested on a charge of conspiracy, but was again acquitted. Nevertheless, in the following year, the charge was renewed. Nothing appears to have been done for some time, but Penn at last, through the kindly offices of his friends, Locke, Tillotson, and others, had the matter thoroughly investigated, and he was finally and honorably acquitted 1693, Nov. 'At no time in his life,' says John Fiske, 'does he seem more honest, brave and lovable.' Shortly afterward his wife died, but in less than two years he married again. His second wife, Hannah Callowhill, was a Bristol lady. In 1699 he made a second visit to the new world, and found Pennsylvania in a prosperous condition. His stay, which lasted two years, was marked by many useful measures, and by efforts to ameliorate the condition both of the Indians and of the negroes. Penn departed for England 1701, Nov. 3, leaving the management of his affairs to a Quaker agent named Ford, whose villainy virtually ruined Penn. When the rogue died, he left to his widow and son false claims against his master, and these were so ruthlessly pressed, that Penn allowed himself to be thrown into the Fleet 1708, to avoid extortion. His friends afterward procured his release, but not till his constitution was greatly impaired. He died at Ruscombe, in Berkshire, leaving issue by both marriages. Upon the Penn controversy it is unnecessary further to enter. Consult: *Memoirs*, edited by Clarkson (1813); biographies, by Janney (1852) Dixon (new ed. 1856, refuting the charges brought against him by Lord Macaulay); Stoughton (1882); Hodges (a small popular biography, 1901); and Buell (1904); also Webb, *The Penns and Pennington* (1867); Fisher, *The True William Penn* (1900). Consult, also, J. Paget's *Inquiry Into the Evidence of the Charges Brought by Lord Macaulay Against William Penn* (1858).

PENNALĪSM, *pĕn'năl-izm:* practice formerly prevalent in the Prot. universities of Germany, which seems to have been essentially the same as the Fagging (q.v.) of the English public schools. The freshmen or students of the first year (called *pennals*—i.e., *pen-cases;* fags) were considered by the elder students ('schorists') as virtually their servants. Whatever property the pennals had they must give up to the schorists, who employed them in the meanest offices, made laughing-stocks of them, and beat and ill-used them—all which had to be endured without complaint. After a year of this discipline followed the ceremony of 'deposition'—a practice older than P. itself, borrowed probably from knightly consecration—in which the pennal underwent a number of symbolical trials, indicative generally of purgation from impurity, and consecration to an intellectual life, after which he took his turn in maltreating his juniors. P. is said to have been introduced in the beginning of the 17th c., and to have been mostly confined to the Prot. universities of Germany. But though the full development of the system may have been thus restricted, germs and modifications of it were much earlier and more general, as is manifest from the prevalence of names of contempt for first year's students (see BEJAN), and from statutes passed by French universities as early as the middle of the 14th c., against levying payments for first footing from them: see also FAGGING. The servitude imposed on the pennals was probably an aping of the usage of chivalry, by which a candidate for knighthood had to serve for a time as page to one already a knight. All attempts to check the evils of P. were long unavailing, as the pennals took part with the schorists in resisting all regulations of the authorities, which would have deprived them of the hope of exercising in their turn a like tyranny upon others. Edicts against the practice were issued in Jena and other universities about the beginning of the 17th c., but it was not till the last half of that century that the universities, by uniting in severe measures, were able to check the evil; and traces of it survived for a long time afterward. In imitation of the students, a kind of P. was adopted by other bodies, particularly by the printers, who retained the ceremony of 'deposition' after it had disappeared from the universities.—Schöttgen, *Historie des Pennalwesens* (Dresd. 1747).

PENNANT, n. *pĕn'năn't*, or PENNON, n. *pĕn'nŏn* [F. *pennon*—from It. *pennone;* Sp. *pendon*, a pointed flag formerly borne at the end of a lance—from L. *penna*, a feather, a wing: It. *pinna*, the flat flap of anything]: narrow flag of great length, tapering to a point, and carried at the head of the principal mast in a govt. ship, to show that she is in commission: a small flag (see PENNON). PEN'NONCEL, or PENNONCELLE, n. *-sĕl* [OF. *pennoncel;* It. *pennoncello*, a little plume or banner]: small pennon, as of a spear or lance; dim. of *Pennon* or *Pennant*.

In the U. S. navy an admiral carries a blue flag with 4 white stars at the head of the mainmast; a vice-admiral a blue flag with 3 white stars at the fore; a rear-admiral a blue flag with 2 white stars at the mizzen; but when two or more admirals of the same grade meet, the senior flies a blue flag, the next a red, the rest white flags. A commodore has a broad blue P. bearing a single white star; this is borne at the main when the commodore is acting as commander-in-chief; when 2 or more commodores meet, the senior flies a blue P., the next a red, the others white pennants. Officers not entitled either to a flag or to a broad pennant show, when commanding a vessel, a narrow P. at the main. Any commanding officer of grade above that of lieut.-commander is entitled to carry on a staff at the bow of his boat a flag or pennant similar to that borne at the mast-head of his vessel.

In the British navy the pennants are borne of three colors—red, white, or blue—according to the color to which the admiral commanding the fleet pertains: see FLAG (FLAG-OFFICER): also PENDANT. A *broad pennant* is a blue pennant, shorter and broader than the above, carried at the mast-head of a commodore's ship, to denote that her captain is the commodore on the station. A first-class commodore hoists his broad pennant at the fore; if of the second class, his flag flies at the mizzen.

PENNANT, *pĕn'năn't*, THOMAS, LL.D.: tourist, naturalist, and antiquary: 1726, June 14—1798, Dec. 16; b. Downing, in Flintshire, Wales. He was educated at Queen's and Oriel Colleges, Oxford. His first important publication was *British Zoology* (1761–69), which contained 132 plates on imperial paper, engraved by Mazel, and established his reputation. In 1769 he made the first of his famous tours to the remotest parts of Scotland, publishing his report 1771. In 1770 he added 103 plates to his *British Zoology*, with descriptive notices; and 1771 printed at Chester *Synopsis of Quadrupeds*, subsequently enlarged and improved under the title *History of Quadrupeds*. In 1772 he undertook his second and most important tour in Scotland, which included a voyage to the Hebrides (an account of which appeared in 3 vols. 1775). In 1773 he published *Genera of Birds*, and made an antiquarian tour through n. England. In 1777 appeared Vol. IV. of *British Zoology*. Among a variety of miscellaneous publications is his amusing life of himself (*The Literary Life of the late Thomas Pennant, Esq., by himself*, 1793).

PENNATE, a. *pĕn'nāt*, or PINNATE, a. *pĭn'nāt* [L. *pennātus*, feathered—from *penna*, a feather or wing]: in *bot.*, feathered—applied to leaflets that are arranged on opposite sides of a common petiole.

PENNATULA, *pĕn-năt'ū-la:* genus of zoophytes (*Anthozoa*), allied to *Gorgonia* (q.v.) and *Alcyonium* (q.v.), and having very similar polyps; but the polyp mass is not fixed by its base, and has a fleshy stem strengthened by a bone, and a skin containing calcareous spiculæ, the upper part of the stem winged on two sides, with numerous pinnæ, along the upper margins of which the polyp cells are ranged. The whole form somewhat resembles a quill, so that the popular name SEA PEN is often given to these zoophytes. One species, *P. phosphorea*, common on northern British coasts, is two to four inches in length, of purplish-red color, and, like many—perhaps all—of the species, is sometimes brilliantly phosphorescent when disturbed. The stalk is hollow in the centre, and the bone which it contains—composed of phosphate and carbonate of lime, like the bones of the vertebrate animals—is a remarkable part of its structure, not extending the whole length of the stalk, slender, straight, and perfectly simple, but bent backward at each end into a hook. Other species are found in the Mediterranean and other seas, some of them more pen-like than

Pennatula (*Virgularia mirabilis*).

even the British one. It has been alleged that they swim by contractions and dilatations of their common fleshy substance, or by movements of the pinnæ; but there is no good evidence of their possessing such power of locomotion, which is contrary to the analogy of all similar zoophytes; and probably the opinion prevalent among Scottish fishermen is correct, that their natural place is at the bottom of the sea, with the somewhat flexible lower end of the stalk immersed in mud. Nearly allied to the pennatulæ is another genus of extremely beautiful zoophytes, *Virgularia*, ranked with them in the family *Pennatulidæ*, and sometimes receiving the popular name SEA RUSH. One species, *V. mirabilis*, resembles a slender rod, bearing throughout the greater part of its length of 6–10 in. two rows of lobes, along the margin of which the polyps are arranged.

PENNIFORM, a. *pĕn'nĭ-fawrm* [L. *penna*, a feather; *forma*, a shape]: shaped like a quill or feather; in *anat.*, applied to muscles of which the fibres pass out on each side from a central tendon.

PENNIGEROUS, a. *pĕn-nĭj'ĕr-ŭs* [L. *penna*, a feather; *gero*, I carry]: bearing feathers or quills.

PENNILESS: see under PENNY.

PENNINERVED, a. *pĕn'nĭ-nėrvd* [L. *penna*, a feather; *nervus*, a nerve]: in *bot.*, applied to leaves which have the nerves or veins arranged like the parts of a feather.

PENNINGTON, *pĕn'ĭng-ton*, WILLIAM SANFORD: 1757–1826, Sep. 17; b. Newark, N. J. He was a major in the revolution, studied law, began practice 1802, served in the state legislature, became assoc. justice of the N. J. supreme court 1804, and was U. S. dist. court judge 1815–26. He was gov. of the state 1813–15, and for a considerable time was chancellor. He published a vol. of *New Jersey Supreme Court Reports*. He died at Newark.

PENNOCK, *pĕn'nok*, ALEXANDER MOSELY: 1813, Nov. 1—1876, Sep. 20; b. Norfolk, Va. He entered the navy 1828, served in the Pacific squadron and later in the Brazil squadron, was inspector of light-houses 1853–56, and was in the Paraguay expedition 1859–60. He was fleet-capt. of the Mississippi squadron 1861–64, and after serving at the Brooklyn navy-yard was connected with the European squadron. He was promoted lieut. 1839, commander 1855, capt. 1863, commodore 1868, rear-admiral 1872. He died at Portsmouth, N. H.

Pennon.

PEN'NON [see PENNANT]: small, pointed, or swallow-tailed flag, carried by the mediæval knight on his lance, bearing his personal device or badge, and sometimes richly fringed with gold. The device was so placed as to appear in its proper position when the weapon was laid for the charge.

PENNSYLVANIA, *pĕn-sĭl-vā″nĭ-a:* (named in honor of William Penn.) One of the thirteen original states in the American Union, situated at the center of the arch formed by the coast states from New England to North Carolina, whence its appropriate soubriquet "The Keystone State;" a state famous for the great fertility of its soil, the wealth and variety of its natural resources, and the richness of its historical memories. It ranks 1st of the union in the production of coal, coke, natural gas, pig iron, steel, and cherries, cement and quarry products; 2nd, in population, wealth, manufactures, fermented liquors, apples and rye; 3rd, in railroad mileage (steam and electric), butter and milk; 4th, in developed water power and pears; 5th, in hay, potatoes, value of farm property, and public roads; 7th, in production of petroleum (but 1st in petroleum area) and tobacco and 9th, in estimated coal area.

PENNSYLVANIA.

Area and Location.—While Pennsylvania is the 2nd state of the union in population and the 6th in density of population, it is (until the admission of Arizona and New Mexico) the 30th in area, being 45,126 square miles in extent. It lies between the parallels of 39° 43″ and 42° 15″ n. lat., and the meridians 74° 43″ and 80° 31″ w. long., bounded on the north by Lake Erie and New York; east by the Delaware River opposite New York and New Jersey; south by Delaware, Maryland and West Virginia, and west by West Virginia and Ohio. Its southern boundary line is the famous Mason and Dixon's line. Extreme length, e. to w. 302:34 m; extreme breadth, n. to s. 175:6 m. The capital is Harrisburg.

Topography.—The s.e. portion is a level plain, gradually rising in the w. to an undulating, hilly tract; the interior ranges from hills to mountains; and the w. portion is, in the main, a rolling plateau. The surface rises from the Delaware river w. and n. to the South and Alleghany Mountains, which extend across the state from n.e. to s.w., ranging from 1,500—3,000 ft. high, and then slopes toward the Ohio river. The highest point in the state is Blue Knob, (3,136 ft.). The state is drained by the Delaware, Susquehanna, and Ohio rivers and their tributaries, and by the Genesee river and Lake Erie. The Delaware river forms the e. boundary, and is navigable for steamships to Philadelphia, large steamboats to Trenton, N. J. (head of tide-water). The Susquehanna river drains the centre of the state and empties into Chesapeake Bay in Md., is not navigable for steamboats in P., but has great value for lumber rafting. The Ohio river is formed at Pittsburg by the Allegheny and Monongahela rivers, which drain the entire w. portion of the state, and are each navigable for steamboats about 60 m. The Juniata is the principal tributary of the Susquehanna, and the Lehigh and Schuylkill rivers of the Delaware. P. has no large lakes, but borders on Lake Erie for 45 m., and has an excellent harbor at Erie. The Delaware river contains several islands belonging to P., chief of which is League Island, used by the federal govt. for naval purposes; and the state also has 2 or 3 islands in Lake Erie.

Climate.—The climate ranges from very hot in the summer in the s. and e., to intense cold and long winters in the central, w., and n. portions, with mean annual temperature in the s.e. 52°, in the centre 48°, and in the n. and n.w. 44°; average fall of rain and snow from 41.3 in. in the w. and n. to 36.7 in. in the s. and e.; climate generally very healthful.

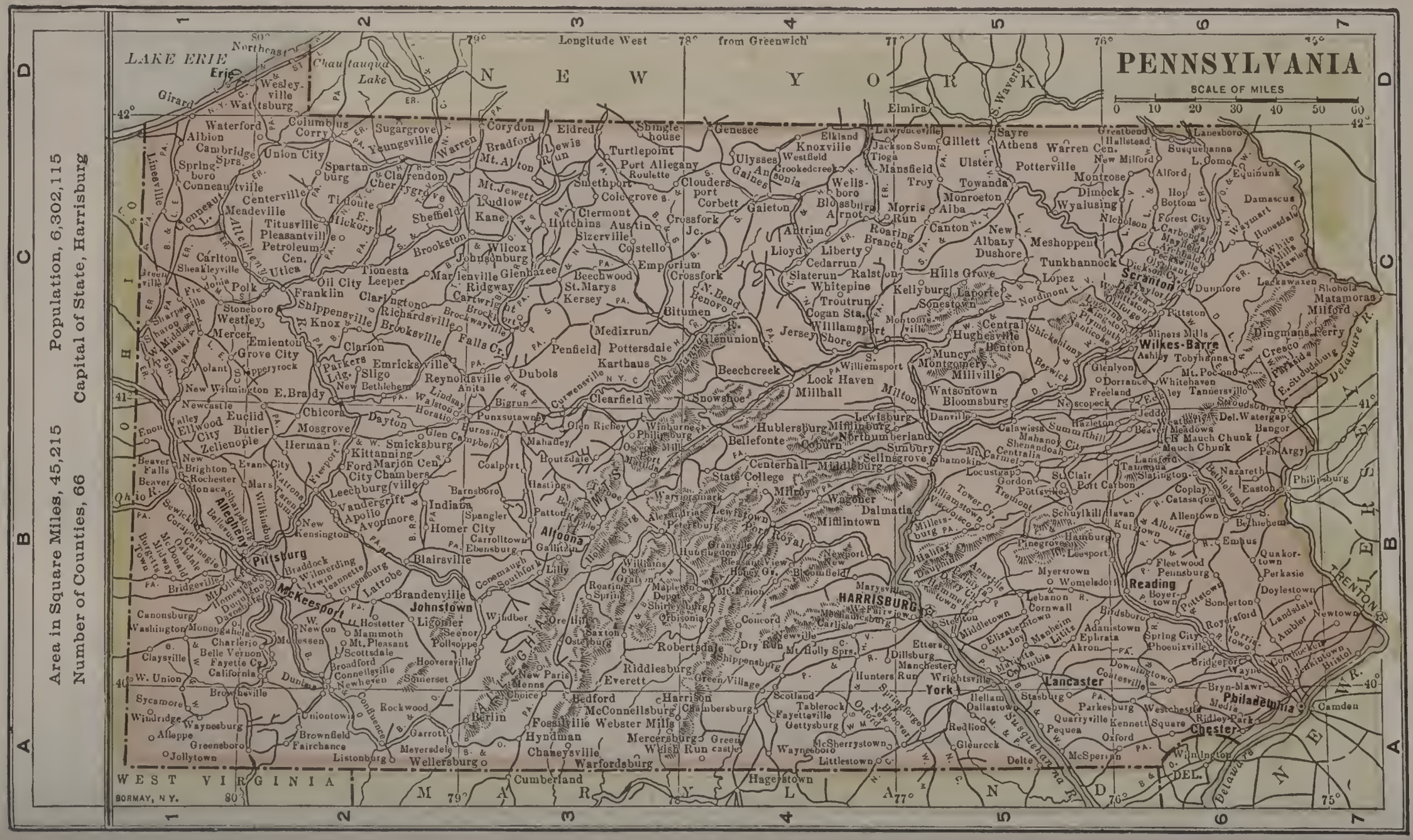
Geology.—The principal formations are the azoic and eozoic rocks, in the s.e.; the mesozoic, extending into N. J. and Md.; and the paleozoic, ranging from the Potsdam sandstone to the coal-measures. Some drift is found in the n. and n.w. cos.; the tertiary and upper secondary formations do not occur on the w. of the Delaware river; and gneiss is confined to the s.e. cos., along the Delaware and Schuylkill rivers, and gives place to lower Silurian limestones, containing quarries of valuable white marble, and

red sandstones, containing near Phœnixville mines of lead, copper, and nickel. Hematite iron ore abounds in the lower Silurian formations; petroleum in the upper Devonian; and salt beneath the coal-measures in the w. The economic properties, besides those mentioned, are granite, brownstone, trap, marbles, zinc, copper, tin, sulphur, fire-clay, some native gold and silver, and numerous mineral springs of high medicinal value. For production of coal, iron, steel, petroleum, natural gas, and slate, see below. P. is exceedingly rich in forests, which contain white pine, hemlock, several species of oak, beech, spruce, fir, cedar, hickory, whitewood, maple in large variety, chestnut, locust, sycamore, elm, catalpa, ash, cherry, and black walnut.

Zoology.—The mountain regions contain a large number of wild animals, among them bears, panthers, wild cat, lynx, wolf, porcupine, red and gray foxes, raccoon, Virginia deer, and some elk. The marten, mink, beaver, skunk, opossum, woodchuck, and musk-rat are abundant. Small game includes several varieties of squirrel and rabbit. Among birds are bald and golden eagles, hawks in variety, turkey-buzzards, owls, whip-poor-wills, and the usual birds of song and plumage common to the latitude.

Agriculture.—Save in the mountainous regions, the soil is everywhere fertile and, where unsuitable for agricultural purposes, is given over to grazing. Altogether there are about 225,000 farms, comprising more than 20,000,000, of which over two-thirds is improved land. The total value of all farm property, including lands, buildings, and improvements, implements and machinery, and live stock is about $1,250,000,000. The principal crops are corn, wheat, oats, rye, potatoes, hay, and tobacco. The dairy products constitute a large part of the output of the farms of the State, while the wool clip is also very valuable.

Manufactures.—There are well over 60,000 manufacturing establishments in P., their aggregate annual output being worth considerably more than $2,000,000,000. From its earliest history P. has been remarkable for its manufactories, and an enormous amount of capital is at present invested in them. In this regard it stands second only to New York, and it is only in that state, too, that the diversity of its manufactures is exceeded. Pre-eminent among its many industries are the making of agricultural implements; bags and other paper supplies; boots and shoes; brick and tile; bridges; carpets and rugs; chemicals; cheese, butter, and condensed milk; men's and women's factory-made clothing; coke; confectionery; cordage and twine; cotton goods; dyeing and finishing textiles; fertilizers; flouring and grist-mill products; foundry and machine-shop products; furniture; glass; hardware; hats and caps; hosiery and knit goods; iron and steel products; jewelry; leather products; liquors, both distilled and malt; lumber and timber products; paints; paper and wood pulp; patent medicines and compounds; paving and paving materials;


PENNSYLVANIA
SCALE OF MILES
0 10 20 30 40 50 60
Longitude West from Greenwich
LAKE ERIE
NEW YORK
WEST VIRGINIA
MARYLAND
DELAWARE
Area in Square Miles, 45,215
Number of Counties, 66
Population, 6,302,115
Capital of State, Harrisburg
Erie
Pittsburg
McKeesport
Johnstown
Altoona
HARRISBURG
Reading
Lancaster
York
Wilkes-Barre
Scranton
Philadelphia
Chester
Allegheny
Monongahela
Ohio R.
Susquehanna R.
Delaware R.
Juniata R.
Conemaugh R.
Kiskiminetas R.
Alleghany Mts.
Blue Mts.
Kittatinny Mts.
Chaulauqua Lake
Conneaut L.
Cumberland
Hagerstown
Gettysburg
Waynesboro
Chambersburg
Carlisle
Mechanicsburg
Lebanon
Pottsville
Shamokin
Mahanoy City
Hazleton
Wilkes-Barre
Scranton
Stroudsburg
Easton
Bethlehem
Allentown
Norristown
Trenton
Camden
DEL.
BORMAY, N.Y.

railroad cars and general-shop work; refining petroleum; roofing and roofing materials; ship building; shirts; silk and silk goods; slaughtering and meat packing; soap and candles; stationery goods; sugar and molasses refining; tobacco products; umbrellas and canes; wire; woolen and worsted goods. From the earliest times P. has held first rank as an iron producer in America, and to-day the state's total iron and steel output is worth about $500,000,000. The pig-iron output is especially notable. All the above-mentioned industries are very important, but particular mention should be accorded textiles, glass and shipbuilding, the latter centring at Philadelphia, while many of the most formidable of the country's battleships have been built within the state.

Minerals and Mining Products.—The enormous anthracite coal deposits of P. are the largest mined anywhere in the world, and are the richest in fixed carbon. The entire coal area of P. is nearly 500 sq. m., and the anthracite area not more than 325 sq. m. The coal region is confined to the n.e. part of the State. The annual production of bituminous coal is almost 100,000,000 tons, and of anthracite about 75,000,000 tons, the latter representing almost the entire output of the country. Coke is likewise a very important product, about 70 per cent. of the nation's total output being supplied by P. Oil was first struck in the vicinity where Titusville now stands in 1859, and though the first oil fields have been exhausted others have been successively discovered and worked, so that the state still ranks high as an oil producer, putting out over 10,000,000 barrels a year. Natural gas, first discovered in 1878, now forms one of P.'s most valuable mineral products. Since the discovery and development of the Lake Superior and Alabama iron mines, P. has lost its pre-eminent position as a producer of iron ore, but it still stands well among the leaders with an annual production of about 1,000,000 long tons. The total value of building stone quarried in the state is over $10,000,000, being divided among limestone, slate, sandstone, marble, trap rock, and granite. P.'s production of cement is also particularly strong, giving it an easy pre-eminence over all other states in this regard.

Forest Products.—Previous to 1876 the timber of P. was regarded as one of its most valuable assets, but wasteful methods during the decade ending with 1870 nearly exhausted the white pine, and since then the main variety of timber cut has been hemlock, which is found in large quantities in the n. part, and constitutes about 65 per cent. of the entire timber output. Oak, white pine, poplar, and spruce come next in importance. In 1901 a forestry department was instituted, and the work of this department has ever since been a prime factor in conserving the state's timber resources.

Fisheries.—The shad and sturgeon fisheries of the Delaware constitute the most valuable fisheries in the State, the value of the year's shad catch being about $500,000. The Susquehanna was formerly the source of

a valuable shad catch, but the catch now rarely exceeds $25,000 in value, and often falls far below that, owing to the use of fish baskets, the building of dams, etc.

Commerce.—In the e. the chief rivers which are navigable and suitable for all classes of vessels are the Delaware and Schuylkill, the former being navigable to Trenton, N. J., and having a channel 25 ft. deep to the sea. In the w. the Alleghany and Monongahela are both navigable for about 60 m. from their junction at Pittsburg, the latter through the aid of locks and slack water basins. The Ohio is one of the chief thoroughfares for steamboat traffic. The state also has some frontage on Lake Erie and enjoys a considerable lake trade. The Delaware and Raritan and the Delaware and Chesapeake canals are the ones used to the greatest extent. Vessels aggregating over 2,000,000 tons annually enter and clear the port of Philadelphia. The value of merchandise imported and exported at the same port each year is about $65,000,000 and $70,000,000, respectively; at Erie, $300,000 and $100,000, respectively, while the annual imports at Pittsburg amount to about $3,000,000.

Railroads.—In 1826 P. undertook the construction of a canal and railroad to connect Pittsburg and Philadelphia. These were both completed by 1831, but in 1857 the state sold out its rights in each line. To-day there is a total trackage of nearly 11,500 miles, divided among many of the most important lines of the country, including such as the Pennsylvania, Erie, Lehigh Valley, New York Central & Hudson River, Lackawanna, Baltimore & Ohio, etc. There is also a very extensive electric street and elevated railway system, comprising altogether more than 3,000 miles of track. Pittsburg and Philadelphia are the most prominent termini.

Finance and Banking.—The total assessed valuation of all property, including both personal and realty, amounts to about $6,000,000,000 and the bonded debt to $2,250,000. The principal sources of revenue are taxes on banks and financial and other corporations and associations, and taxes on personal property, licenses, etc. There are over 700 national banks, about 125 State banks, about 20 savings banks, about 250 loan and trust companies, and about 1,250 building and loan associations. Philadelphia and Pittsburg both conduct very large clearing-house businesses, while the clearing-house business is also important in Scranton and Wilkesbarre.

Religion.—The majority of religious bodies are represented in P., the strongest being the Roman Catholics, the Methodist-Episcopalians, Presbyterians, Lutherans, Protestant Episcopalians, and members of Evangelical bodies.

Education.—P. annually spends considerably over $30,000,000 in the maintenance of its public schools, in which there are over 1,300,000 pupils enrolled, with about 35,000 teachers. The state is divided into normal school districts, each one of which is equipped with a state normal school. There are also about 150 private secondary schools, co-educational colleges and universi-

ties, besides those for men only and colleges and seminaries for women only, and schools of theology, technology, law, medicine, music, dentistry, pharmacy, and forestry. There are also a great number of business and commercial colleges, as well as training schools for nurses, reform schools, and schools for the deaf, dumb, blind, and feeble-minded. The most prominent among the institutions for higher education are the University of P., Swarthmore College, Dickinson C., Lafayette C., Haverford C., Bucknell U., State College, and, for women, Bryn Mawr.

Charities and Corrections.—Besides a host of private and denominational charities, P. has the usual institutions for the deaf, dumb, blind, insane, and feeble-minded, besides soldiers' and sailors' homes. There are also reformatories, houses of refuge, industrial homes, and penitentiaries. The penal institutions include the Eastern Penitentiary at Philadelphia, the Western Penitentiary at Alleghany, the Industrial Reformatory at Huntingdon, and the reform school at Morganze. All institutions of a charitable or corrective nature come under the general supervision of the state board of public charities.

History.—Hendrik Hudson entered the bay of New York 1609, Sept. 9, and the same year discovered, but did not attempt to explore, Delaware Bay. The following year the Dutch E. India Co. sent a vessel from Amsterdam to seek trade with the American natives. Some members of this first trading expedition penetrated the country to Delaware Bay and explored the lower part of Delaware river. Under the authority of the States-General, Cornelis Hendricksen headed an expedition which ascended the Delaware river 1616 for the purpose of enlarging trade relations. The whole unoccupied territory between Canada and Va. was recognized as the possession of the United New Netherland Co. during the existence of its grant 1614–21; and afterward was claimed by the Dutch W. India Co., which succeeded the former company. The Dutch built Fort Nassau on the Delaware river 1623, but the first actual settlement in P. was by Swedish colonists at Tinicum Island. After Petrus Stuyvesant had settled the Indian war in New Amsterdam, which had broken out during the administration of Gov. Kieft, his predecessor, he turned his attention to the English colonists on the Connecticut river and the Swedes on the Delaware. The latter being the weaker were the first objects of his ambition, and 1655 he marched on their settlements and took possession of their territory. Five years afterward the Dutch established a colony from New Amsterdam at the Minisinks. In 1664 Charles II. granted all the territory between the Connecticut and Delaware rivers to his brother, the Duke of York, and, excepting the few months 1673–4, when the Dutch held the territory through recapture, the settlements on the Delaware remained under the govt. of N. Y. till 1681,

Mar. 4. That day Charles II. granted to William Penn (q.v.) the territory described as 'a tract of land in America lying n. of Maryland, on the e. bounded with Delaware river, on the w. limited as Maryland, and northward to extend as far as plantable,' and named the tract Pennsylvania. Penn landed at New Castle 1682, Oct. 27 (o.s.); visited Philadelphia the following month; organized his govt. 1683; and returned to England to establish more clearly the boundary between his possessions and Md. 1684. He returned for a few months 1699, and prepared a new constitution for the colony and gave Philadelphia a charter. On his death (1718) his heirs succeeded him as proprietaries. Under Penn's wise and liberal administration, the colony was built up rapidly by immigration, and friendship was maintained with the Indians till the war between France and Great Britain 1744, when the French secured the powerful tribes as allies. 1755, July 9, the British and provincial troops under Gen. Edward Braddock (q.v.) were defeated by the French and Indians at Fort Du Quesne, now Pittsburg, and during that and the following years the colony suffered severely from ravages by Indians. A treaty 1758 was observed by the Indians till 1763, when the Pontiac war kept the colony in terror for a year.

The long-disputed boundary between P. and Md. was settled 1763–67 by the Mason and Dixon's Line (q.v.); the 'new purchase,' a large tract in the n. and n.w. of the present state, was acquired by the proprietaries by treaty with the Six Nations 1768; the merchants of P. signed the non-importing agreement and destroyed much taxed tea 1774; and the first continental congress was held in Philadelphia 1774, Sept. 5—Oct. 26. A provincial convention was held in Philadelphia 1775, Jan. 23; a committee of safety was appointed after the battle of Lexington; the second congress assembled in Philadelphia May 10, and adopted the Declaration of Independence (q.v.) 1776, July 4; the proprietary govt. was abolished, and a state constitutional convention held, 1776, July 15; congress reconvened in Philadelphia 1777, Mar. 4, and 1778, July 2; the battle of Brandywine was fought 1777, Sept. 11; the massacre of Paoli occurred Sept. 20; the British occupied Philadelphia Sept. 26, defeated the Americans at Germantown Oct. 4, and held Philadelphia till 1778, June 18; and the royal charter was annulled. Excepting during the British occupation, Philadelphia was the capital of the colony and state till 1799, and was the seat of the federal govt. 1790–1800. Lancaster became the capital 1799, and Harrisburg 1812. A 'whisky insurrection,' against excise laws caused much disturbance in w. P. 1794; the first and second U. S. banks were established in Philadelphia; the war of 1812 was very disastrous to the commerce of P.; the state constitution was revised 1838, amended 1850, 57, and 64, and

superseded by the present one 1874; and petroleum was discovered 1859. The first call for volunteers in the Civil war was responded to by nearly twice the 75,000 required, and Gov. Curtin was enabled to organize a reserve of 11 regiments, besides the 14 which constituted the quota of the state. Altogether P. contributed 362,284 men to the Union armies, exclusive of militia. The state was thrice invaded; the invasions of 1862 and 1864 were mere raids, but it was 'the high tide of the Confederacy' which rolled into the Cumberland Valley in 1863, July, and was forced back at Gettysburg. Among the generals who commanded in that three days' battle Geary, Hancock, Meadè, and Reynolds were natives of the state. Chambersburg was captured and a large amount of milit. stores was burned 1862, Oct.; the battle of Gettysburg was fought 1863, July 1, 2, 3; and Chambersburg was again captured and almost wholly destroyed (with a loss of more than $2,000,000) 1864, July. The financial panic of 1873 and the succeeding years of industrial stagnation were attended by serious social disturbance. The story of the reign of terror instituted in the anthracite regions by the 'Molly Maguires' in 1873 pertains to the history of crime rather than of industry, and the 'Mollies' were a sprout from foreign soil. The Railway Riots of 1877, July, which centred in Pittsburg, cannot be dismissed, however, as having been manifestations of imported lawlessness. The local authorities displayed lamentable weakness in permitting the mob to grow to dangerous dimensions; they were guilty of something worse than negligence if the testimony that the militia were fired on from a police station be credible. In 1892 again forcible methods to prevent a reduction of wages plunged a part of the commonwealth into a state bordering on civil war when the military and the striking steel workers confronted one another at Homestead. In 1902 occurred the great strike of the anthracite coal miners, but after several months of idleness and hardships endured by both the parties most vitally affected and general public discomfort attendant upon lack of coal and enormously high prices for that obtainable, the matter was amicably adjusted, and with the exception of the threatened strike in the spring of 1906, no trouble has since been experienced there in that quarter.

Government.—The executive authority is vested by the constitution (1874) in a gov., elected for 4 years and ineligible for re-election for the next succeeding term; a lieut. gov., elected for 4 years; sec. of internal affairs, elected for 4 years; sec. of the commonwealth, atty.-gen., and supt. of public instruction, appointed by the gov. for 3 years each; auditor-gen., elected for 3 years, and state treas., elected for 2 years. The gov. must be at least 30 years old, and must have been a citizen and an inhabitant of the state 7 years next preceding his

election, unless absent on business of the United States or of the state. No member of congress nor any person holding any office under the United States or of the state can exercise the office of gov. He has a veto power over every bill passed by the legislature; but if, notwithstanding his objection, two-thirds of both houses agree to the bill after reconsideration, it becomes a law. No pardon can be granted by the gov. except on recommendation of the lieut. gov., sec. of state, atty.-gen., and sec. of internal affairs, or any 3 of them; these officials constituting the board of pardons. The gov. may refuse a pardon notwithstanding the recommendation of the board. In case of his death, removal, or other disability, the office devolves on the lieut. gov., who otherwise is pres. of the senate; and in case of the death, removal, disability, or accession of the lieut. gov. to the office of gov., the office of lieut. gov. devolves on the pres. *pro tem.* of the senate. Should there be a vacancy in the office of lieut. gov. when a vacancy in the office of gov. occurs, the pres. *pro tem.* of the senate becomes gov. Contested elections for gov. or lieut. gov. are decided by a committee from both houses of the assembly, with the chief-justice presiding. The legislative authority is vested in a general assembly, comprising a senate of 50 members, elected for 4 years, and a house of representatives of 204 members, elected for 2 years, salary of each $1,500 for 100 days, $10 per day for excess of 100 days not exceeding 50 days, and 20 cts. mileage; sessions biennial; limit 150 days. State senators must be at least 25 years old, and representatives 21; each must have been a citizen and an inhabitant of the state for 4 years, an inhabitant of his district for 1 year, next preceding his election, unless absent on business of the United States or of the state, and must reside in his district during the tenure of his office. The constitution restricts the general power to legislate, prohibiting special legislation in many instances, and limiting the power of appropriating public money to charitable objects. All laws relating to taxation and courts of justice are general and uniform in their operation through the state; and restrictions are laid upon the right of the state or of any municipality therein to contract debts. Special legislation for cities is not permitted under the present constitution, but under the guise of a general law Philadelphia has a charter of its own and special provision is made for the municipal government of Pittsburg and Scranton. The judicial authority is vested in a supreme court of 7 judges, elected for 21 years, or during good behavior within that period, and ineligible for re-election; 6 associate justices; courts of oyer and terminer and general jail delivery; courts of common pleas; orphans' courts; courts of quarter sessions of the peace; magistrate courts; special orphans' courts in cos. of more than 150,000 pop.; special courts of common pleas of

co-ordinate powers; other special courts provided by the constitution; and the usual co. courts and officers. All judges, excepting those of the supreme court, are elected for 10 years or during good behavior within that period; and co. officers are elected for 5 years. The supreme court holds one session each year in Philadelphia, Harrisburg, and Pittsburg, for the adjudication of writs of error, appeals, etc., and certiorari. The style of all process is required to be 'The Commonwealth of Pennsylvania.' The state is divided into two districts for holding U. S. district courts; courts in the e. district are held in Philadelphia, and in the w. district in Pittsburg, Williamsport, and Erie.

The successive govs., with their terms of service, are as follows: *Colonial, Swedish:* Peter Minuit 1638; Peter Hollandaer 1641; John Printz 1643; John Pappegoya 1643; Johan C. Rysingh 1654; *Dutch:* John P. Jacquet 1655; *City and Company,* 1657–62; Jacob Alricks (city) 1657; Alexander d'Hinoyossa (city) 1659; Goeran Van Dyke (company) 1657; William Beekman 1658; *United Colony:* William Beekman 1662; Alexander d'Hinoyossa 1663; *English:* Richard Nicolls 1664; Robert Carr (deputy) 1664; Francis Lovelace 1667; *Dutch:* Anthony Colve 1673; Peter Alricks (deputy) 1673; *English:* Sir Edmund Andros 1674; *Proprietary:* William Markham (deputy) 1681; William Penn 1682; Council, Thomas Lloyd, pres., 1684; Commissioners 1688; John Blackwell (deputy) 1688; Council, Thomas Lloyd, pres., 1690; Thomas Lloyd (deputy) 1691; William Markham (deputy) 1691; *Crown:* Benjamin Fletcher, also gov. of N. Y., 1693; William Markham (lieut. gov.) 1693; *Proprietary:* William Markham 1695; William Penn 1699; Andrew Hamilton 1701; Council, E. Shippen, pres., 1703; John Evans 1704; Charles Gookin (lieut. gov.) 1709; Sir William Keith (lieut. gov.) 1717; Patrick Gordon (lieut. gov.) 1726; Council, J. Logan, pres., 1736; George Thomas (lieut. gov.) 1738; Council, A. Palmer, pres., 1747; James Hamilton (lieut. gov.) 1748; Robert H. Morris (lieut. gov.) 1754; William Denny (lieut. gov.) 1756; James Hamilton (lieut. gov.) 1759; John Penn 1763; Council, J. Hamilton, pres., 1771; Richard Penn 1771; John Penn (lieut. gov.) 1776; *Revolution:* Committee of Safety, Benjamin Franklin, chairman, 1776, Sep.—1777, Mar.; *Supreme Executive Council,* presidents: Thomas Wharton, Jr., 1777, Mar. 5; George Bryan (act'g) 1778, May 23; Joseph Reed 1778, Dec. 22; William Moore 1781, Nov. 15; John Dickinson 1782, Nov. 7; Benjamin Franklin 1785, Oct. 18; Thomas Mifflin 1788, Nov. 5; *State:* Thomas Mifflin 1790; Thomas McKean 1799; Simon Snyder 1808; William Findlay 1817; Joseph Heister 1820; John A. Schulze 1823; George Wolf 1829; Joseph Ritner 1835; David R. Porter 1839; Francis R. Shunk 1845; William F. Johnston 1848; William Bigler 1852; James Pollock 1855; Andrew G. Curtin

1861; John W. Geary 1867; John F. Hartranft 1873; John F. Hartranft 1876; Henry M. Hoyt 1879; Robert E. Pattison 1883–87; James A. Beaver 1887–91; Robert E. Pattison 1891–95; Daniel H. Hastings 1895–99; William A. Stone 1899–1903; Samuel W. Pennypacker 1903-07; Edwin S. Stuart 1907-11; John K. Tener, 1911—.

Politics.—Elections are held on Tuesday after the 1st Monday in Nov. Local elections for city, town, and borough officers are held on the third Tuesday of Feb. The qualifications of electors are: Every male citizen, 21 years of age, who shall have been a citizen of the United States at least one month, and who shall have resided in the state one year, and in the election district where he offers to vote two months, immediately preceding the election, and who shall have within two years paid a state or co. tax assessed at least two months, and paid at least one month, before the election, is entitled to the rights of an elector. Citizens of the United States between the ages of 21 and 22 years and otherwise qualified are entitled to vote without the payment of taxes. P. has 34 electoral votes. Her votes for pres. and vice-pres. have been as follows: 1788, George Washington 10, John Adams 8, John Hancock 2; 1792, George Washington 15, John Adams 14, George Clinton 1; 1796, John Adams 1, Thomas Jefferson 14, Thomas Pinckney 2, Aaron Burr 13; 1800, Thomas Jefferson 8, Aaron Burr 8, John Adams 7, C. C. Pinckney 7; 1804, Thomas Jefferson and George Clinton 20; 1808, James Madison and George Clinton; 1812, James Madison and Elbridge Gerry 25; 1816 James Monroe and Daniel D. Tompkins; 1820, James Monroe and Daniel D. Tompkins 24; 1824, Andrew Jackson and John C. Calhoun 28; 1828, Andrew Jackson and John C. Calhoun; 1832, Andrew Jackson and William Wilkins 30; 1836, Martin Van Buren and Richard M. Johnson; 1840, William H. Harrison and John Tyler; 1844, James K. Polk and George M. Dallas 26; 1848, Zachary Taylor and Millard Fillmore; 1852, Franklin Pierce and William R. King, 27; 1856, James Buchanan and John C. Breckinridge; 1860, Abraham Lincoln and Hannibal Hamlin; 1864, Abraham Lincoln and Andrew Johnson 26; 1868, U. S. Grant and Schuyler Colfax; 1872, U. S. Grant and Henry Wilson 29; 1876, Rutherford B. Hayes and William A. Wheeler; 1880, James A. Garfield, and Chester A. Arthur; 1884, James G. Blaine and John A. Logan 30; 1888, Benjamin Harrison and Levi P. Morton 30; 1892, Benjamin Harrison and Whitelaw Reid 32; 1896, William McKinley and Garret A. Hobart 32; 1900, William McKinley and Theodore Roosevelt 32; 1904, Theodore Roosevelt and Charles W. Fairbanks 34; 1908, W. H. Taft and J. S. Sherman 34.

Counties and Principal Cities.—P. is divided into 67 counties, the most populous of which in 1910 were: Philadelphia, Allegheny, Luzerne, Lackawanna, Schuyl-

kill, Westmoreland, Berks, Lancaster, Montgomery. The cities of the state are divided into three classes, according to population. Philadelphia alone answers the requirements of a city of the first class and Pittsburg and Scranton of the second class. The more important cities of the third class, are: Allentown, Altoona, Chester, Easton, Erie, Harrisburg, Johnstown, Lancaster, McKeesport, Newcastle, Reading, Wilkesbarre, Williamsport and York.

The population is mainly of English and German descent, but contains elements of nearly all European nationalities. Of the foreign born population the largest number are Germans; then in order come Irish, English, Austrians, Italians, Russians and Poles.

Population.—(1790) 434,373; (1800) 602,365; (1810) 810,091; (1820) 1,047,507; (1830) 1,348,233; (1840) 1,724,033; (1850) 2,311,786; (1860) 2,906,215; 1870) 3,521,951; (1880) 4,282,891; (1890) 5,258,014; (1900) 6,302,115. In 1910, about one million more.

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PENNSYLVANIA COLLEGE: at Gettysburg, Penn., founded 1832, 1 for both sexes. It is conducted in the interests of the General Synod portion of the Lutheran Church. The institution was begun with no endowment. In its earlier history it received some aid from the state in common with the other colleges in Penn.

During the battle 1863, July 1–3, the college buildings were used as hospitals, and within their walls met Union and rebel soldiers who had been former students of the college. In 1850 the charter was modified to incorporate Franklin and Marshall College, and the

Franklin professorship was endowed by the funds thus obtained.

The college offers two regular courses, classical and scientific; a teacher's course is also given in the spring term; and provision is made for special work for those who are not candidates for a degree, and for graduate work. There is also a preparatory department. The buildings include two dormitories, Recitation hall (containing the library), the chapel, the chemical laboratory, the astronomical observatory, and the gymnasium. The library contains over 30,000 volumes. In 1910, the annual income was $46,000; the students numbered 315 and the faculty 19.

PENNSYLVANIA COLLEGE FOR WOMEN, located at Pittsburg, Pa. It was founded in 1869 under the auspices of the Presbyterian Church. The collegiate department offers a classical and a literary course and confers the degrees of A.B. and B.L. Instruction is given in music and art, and there is also a preparatory department. 1903, the grounds and buildings were valued at over $150,000; the annual income was $40,000. The library contained 3,000 volumes; the students numbered 200, and the faculty 25.

PENNSYLVA'NIA DUTCH: fusion of German dialects from the region of the upper Rhine, including Switzerland, with an admixture of English: it is spoken by descendants of the early German settlers in Penn. P. D. is a dialect of German, and does not differ in any essential particulars from German as spoken by the peasantry in the home countries. It has borrowed many words from the English, but its syntax is the syntax of the German language. The author of the 'Babble-beem' (Poplar Trees) published a vol. of verses 1870 in P. D. Prof. Haldemann, of the Univ. of Pennsylvania, wrote, 1872, an essay in P. D.: both works are issued by the publication board of the Reformed Church.

PENNSYLVANIA-GERMAN SOCIETY, an association organized 1891, Apr. 15, at Lancaster, Pa., to collect, preserve, and publish letters, papers, and documents relating to the Pennsylvania-Germans in America. The members must be direct descendants of early German, Holland, or Swiss emigrants to the colony of Pennsylvania. There are now 400 members. Meetings are held annually.

PENNSYLVANIA STATE COLLEGE: institution at State College, Penn. (non-sect.), organized 1855; for both sexes. It was organized as the Farmers' High School, and in 1862 the name was changed to the Agricultural College of Pennsylvania. The legislature having appropriated the income from the national land grant of 1862, the scope of the college was broadened, and the name changed in 1874 to Pennsylvania State College. The technical courses are agriculture, biology, chemistry, civil engineering, electrical engineering,

mathematics, mechanical engineering, mining engineering, and physics. The general courses include general scientific, classical, Latin-scientific, and philosophical. There are also short winter courses in agriculture and creamery work, two-year courses in chemistry, mechanic arts, and mining, and an elementary course in mechanics; a summer school of two weeks and correspondence courses in agriculture. The agricultural experiment station is connected with the college, and receives a separate federal appropriation of $15,000 annually. The farm and grounds contain 400 acres of which 250 are under cultivation; the value of grounds and building in 1905 was about $1,300,000. The college is excellently equipped with scientific laboratories and museums, and the library in 1905 contained 22,094 volumes. The income is derived mostly from the national land grant fund, from the annual federal appropriation ($25,000), and from state appropriations; in 1903–4 the total income was $237,192.12. The students in 1904–5 numbered 749 and the faculty 62.

PENNSYLVA'NIA, UNIVERSITY OF: univ. proper in West Philadelphia; a state institution. Its origin is traced to a pamphlet by Benjamin Franklin, 1749—*Proposals relating to the Education of Youth in Pennsylvania.* On the plan that he proposed, an assoc. was formed to found a school; £2,000 (equal to $40,000 now) was raised, and a building was bought which had been erected for the large congregations of Whitefield. An acad., with Eng., math., and Latin depts., was opened 1751. It was enlarged to a coll. 1755, entitled 'The Coll., Acad., and Charitable School of Philadelphia,' and empowered to confer degrees. The first commencement occurred 1757, when 7 received the degree A.B. The provost, the Rev. William Smith, for his opposition to the non-resistance policy of the legislature during the French war, was thrown into prison, but heard his classes there. Released, he visited England, received the degree LL.D. from Oxford, and, on a second visit to raise money, 'divided the land' with an agent of Columbia Coll., both meeting with success. The archbishop of Canterbury and others wrote from England recommending a continuance of the broad undenominational plan, but the legislature, 1779, took advantage of the wording of the reply to wrest the coll. from its corporators and found a univ.; the wrong was righted 10 yrs. later; the old coll. and the univ. amalgamated. The old location is now the site of the new post-office. The univ. is in the S. W. quarter of the city, opposite the South st. bridge over the Schuylkill river, near the Powelton ave. station of the Pennsylvania r.r., the grounds lying chiefly on Woodland ave. The present organization of the univ. includes: (1) the Coll.; (2) the Dept. of Philosophy or Graduate School; (3)

the Dept. of Law; (4) the Dept. of Medicine; (5) the Univ. Hospital; (6) the Wistar Inst. of Anatomy and Biology; (7) the Laboratory of Hygiene; (8) the Dept. of Dentistry; (9) the Dept. of Veterinary Medicine; (10) the Veterinary Hospital; (11) the Univ. Library; (12) the Dept. of Archæology; (13) the Flower Astronomical Observatory; (14) the Dept. of Physical Education. The coll. includes the School of Arts which offers courses in arts and sciences, in biology, and in music; the Wharton School of Finance and Commerce, the Towne Scientific School, which offers courses in architectural, mechanical, and electrical engineering, civil engineering, chemistry, and chemical engineering, and the courses for teachers. The object of the Wistar Inst. of Anatomy and Biology is to afford facilities to post-graduate and advanced students; it is a distinct corporation with separate funds, but organically united with the univ., so as to constitute one of its depts. The library is one of the original depts. of the univ., and contains many interesting historical documents; it includes several special libraries, and contained (1905) 234,527 volumes. The Museum of Archæology (organized 1889) was made a dept. of the univ. in 1891; in 1897 Mrs. Lucy Wharton Drexel gave to his dept. a fund for a gold medal to be awarded annually to an English-speaking scholar whose archæological excavation or publication based on such excavation, should be deemed worthy of honor; in 1902 E. W. and C. H. Clark founded in this dept. the Clark Research Chair of Assyriology, endowed with $100,000. Women are admitted to the courses for teachers, the courses in biology, and the course in music in the coll.; and there is a graduate school for women in the Dept. of Philosophy. Among the buildings, which number 33, are Houston Hall, the centre of the student social life; College Hall, the library, the archæological museum, and the gymnasium. The value of grounds and buildings in 1904 was about $5,700,000. The total assets amounted to $11,647,085, and the annual income, exclusive of gifts, was $687,443. The students in all departments numbered 2,682 and the faculty 316.

PENNULE, n. *pĕn'nūl* [L. *pennula*—dim. from *penna*, a feather]: a small feather, or division of a feather.

PENNY, n. *pĕn'nĭ* [Dut. *penninck;* Ger. *pfennig*, a small coin: Bohem. *penizek*, a little piece of money: Manx, *peng*, a penny]: originally probably a coin in general: an English copper coin, 12 of which are equal to a shilling (see below): a small sum; money in general: plu. PEN'NIES, *-nĭz*, when number is meant: plu. PENCE, *pĕns*, when amount or value is indicated. PEN'NILESS, a. *-nĭ-lĕs*, destitute of money; poor. PEN'NILESSNESS, n. *-nĕs*, state of being without money. PENNYWISE, saving small sums at the hazard of larger. PENNY-A-LINER, a humble contributor to a newspaper, who is paid at the rate of 1*d.* or 1½*d.* a line; a contemptuous name for an ill-paid author. PENNY-WEDDING, or PENNY-BRIDAL, in Scotland, wedding at which the invited guests made contributions in money (seldom more than 1*s.* each), to pay the general expenses, and leave over a small sum, to assist the newly-married pair in furnishing their dwelling. This practice, now disused, was prevalent in the 17th c.; and was denounced by presbyteries and kirk-sessions, and 1645 by the gen. assembly, as leading to 'profane minstrelsing and promiscuous dancing.' PENNYWEIGHT, a weight of 24 grains troy. PENNY-WORTH, good value; a bargain; a small quantity.

PENNY: a British coin and money of account, of the value of about two cents in federal money. After the Sceattæ (q.v.) it is the most ancient of English coins, and was the only one generally current among the Anglo-Saxons. The name is evidently the same as the German *pfennig;* and both words seem intimately connected with the old German *pfant*, a pledge, and the Latin *pendo*, to weigh or to pay. Both in Britain and on the continent the word was used anciently for money in general; hence such phrases as 'he has got his *penny-worth*,' i.e., he has got value for his money; etc. The P. is mentioned first in the laws of Ina, King of the West Saxons, about the close of the 7th c. It was at this time a silver coin, and weighed about 22½ troy grains, being thus about $\frac{1}{240}$ of the Saxon pound-weight. This relation to the pound-weight is evidently derived from the usage of the early Franks, who retained the Roman division of the *libra* into 20 *solidi*, and the *solidus* into 12 *denarii* (the denarius being thus the 240th part of the libra or pound. See MARK. Halfpence and farthings were not coined in England till the time of Edward I., but the practice previously prevailed of so deeply indenting the P. with a cross mark, that the coin could be easily broken into two or four parts as required. Silver farthings ceased to be coined under Edward VI., and silver halfpennies under the Commonwealth. By this time the P. had steadily decreased in weight; it was 18 grains under Edward III., 15 and 12 under Edward IV., 8 under Edward VI., and under Elizabeth it was finally fixed at $7\frac{23}{31}$ grains, or $\frac{1}{62}$ of an ounce of silver, a value to which the subsequent copper pennies, which till 1860 were the circulating medium, closely approximated. In 1672 an authorized copper coinage was established, and halfpence

and farthings were struck in copper. The copper P. was not introduced till 1797, when also the coinage of two-penny pieces was begun; but these latter, being found unsuitable, were withdrawn. The P. of the present bronze coinage is of only about half the value of the old copper P. The German *pfennig* also was originally a silver coin, bearing the same relation to the German pound of silver as the English P. to its pound. The old Scottish P. was only ½ of the English one, as the pound Scots and the Scots shilling were also ¼ of the English coins of the same name. In the 12th c. the P. was made very broad and thin. In the beginning of the 14th c. the mark of silver was anew divided into 60 parts or coins, which, to distinguish them from the old coins, were called *grossi denarii*, whence the term *groschen*.

PENN YAN, *pĕn yăn'*: village, cap. of Yates co., N. Y.; on the Northern Central and the Fall Brook Coal Companies' railroads, and at the outlet of Keuka Lake, 43 m. n. by w. of Elmira. There is an acad.; a semi-monthly and several weekly newspapers; and state and national banks. The place is said to have been named from the two elements prominently combined in its settlement—Pennsylvanians and Yankees. Steamers run to Hammondsport at the other end of the lake. There is abundant water-power, utilized in flour-mills, lumber-mills, and factories of various kinds. There is considerable local trade. The surrounding agricultural region is noted for productiveness. Fruit of various kinds is extensively grown, and grapes are produced in great quantities. Pop. (1900) 4,650; (1910) 4,597.

PENNYPACKER, *pĕn'ĭ-păk-ĕr*, Galusha: born Valley Forge, Penn., 1844, June 1. He studied at an acad., entered the Union army as a private when 17 years of age, served in Florida, and in the attack on Charleston, received three wounds at Drury's Bluff, Va., participated in the siege of Petersburg, and was badly wounded at Fort Fisher. He received the brevets of brig.gen. and maj.gen. of vols. for brilliant service, and 1867 received the same brevets in the U. S. army. He was appointed col. of infantry 1866, and retired 1883.

PENNYPACKER, Samuel Whitaker, historian and statesman: born Phœnixville, Pa., 1843, April 9. He was educated at the West Philadelphia Institute, and on graduating enlisted in the Union army. As a member of the 26th Pennsylvania 'Emergency' regiment he participated in the battle of Gettysburg. After the close of the war he studied law at the University of Pennsylvania, and in 1868, subsequent to his admission to the bar, he was chosen president of the Law Academy of Philadelphia. While holding this position he compiled four volumes of the Pennsylvania Supreme Court reports. In 1889 he was appointed judge of the court

of common pleas, to fill a vacancy, and the following year he was elected to the same position without opposition. His term was for ten years, and during a part of the time he was president of the court. In 1902 he received the Republican nomination for Governor and was elected; in this position he approved a law intended to suppress or regulate political cartooning and to restrain the press from extreme criticism of public officials. The measure was severely criticised and lampooned, both within and without the borders of the state, by the very element which it was intended to restrain; and to such an extent was this carried that the law became practically a dead letter. P. has been especially interested in the study of local history and biography, and he has a valuable collection of early Pennsylvania reprints. He is author of *Annals of Phœnixville and Vicinity; Historical and Biographical Sketches; The Settlement of Germantown; Congress Hall; Capture of Stony Point*, and other historical books and papers.

PENNYROYAL, n. *pĕn'nĭ-roy'ăl* [*penny* is corrupted from OE. *puliol*, arising from the L. *pulcium regĭum*, penny-royal—from *pulex*, a flea]: species of mint (q.v.). The name P. is given in N. America to a small plant, *Hedeosma pulegioides*, allied to the mints, and having like them, a pleasant aromatic smell, and a warm pungent taste: it is much in use in domestic medicine in the form of a warm infusion to promote perspiration and as an emmenagogue.

PENOBSCOT, *pē-nŏb'skŏt*. RIVER: stream in Maine, rising near the centre of the state by two branches, from a chain of lakes extending from n.w.; and after a s. by w. course of 135 m. from the junction or 275 m. in all, empties into Penobscot Bay, a broad and sheltered opening into the Atlantic Ocean, 20 m. wide, with several large islands. Its chief towns are Belfast, at its mouth; Bangor, 50 m. above, where falls supply power to saw-mills and factories; Castine and Bucksport. It is navigable to Bangor, where there is a tide of 20 ft. The chief trade is pine timber.

PENOBSCOTS, *pē-nŏb'skŏts*, AND PASSAMAQUODDIES, *păs-a-ma-kwŏd'ĭz*: tribes of Indians in Maine; the former on an island in the Penobscot river, near Oldtown; the latter near Passamaquoddy Bay. They are members of the Abenaqui branch of Algonquins, and closely connected with the Indians in New Brunswick. By the early French settlers they were called Malecites and Etechemins. For their services in the revolution the colonists gave them a large tract of land on the banks of the Penobscot river, the larger part of which they have sold. The Penobscots are Roman Catholics, and have several religious books in their own language. Schools are maintained and the people choose their own civil officers.

PENOLOGIST, n. *pē-nŏl'ŏ-jĭst* [L. *pœnālis,* penal—from *pœna,* punishment; Gr. *logos,* discourse (see PENAL)]: one who studies the various kinds of punishment as awarded to criminals, with view to their reformatory effect.

PENROSE, *pĕn'rōz,* BOIES: American lawyer and politician: b. Philadelphia, Pa., 1860, Nov. 1. He was graduated from Harvard in 1881, studied law, and was admitted to the bar in 1883. In 1884 he was elected to the lower house of the Pennsylvania legislature; in 1886 he was elected to the State Senate and several times re-elected, serving till 1895, for two terms (1889–93) he was president *pro tem* of the Senate. In 1897 he became United States Senator, and in 1903 was re-elected for the full six years' term. He wrote with Allison *History of the City Government of Philadelphia* (1887).

PENSACOLA, *pĕn-sa-kō'la*: Fla., city, port of entry, and county-seat of Escambia County, on Pensacola Bay; 6 miles north of the Gulf of Mexico; 48 miles east of Mobile and 204 miles west of Tallahassee. It is on the line of the Louisville & N. and the Pensacola, A. & T. railroads. The city has an excellent land-locked harbor with from 31 to 33 feet of water on the bar. The climate here is mild and very healthful. The city has gas, electric light, water and street railway plants. Here are a United States navy-yard and three forts, Pickens, Barnacas, and McRee. The remains still exist of the old Spanish forts of San Bernardo and San Miguel. There is a State armory, Federal government building, opera house, court-house, and 11 public school buildings.

Pensacola is a considerable commercial centre, having a large domestic trade in lumber, fish, naval stores, cotton, phosphate, and coal. It has three national and several private banks. The city was first permanently settled in 1696, by a colony of Spaniards from Vera Cruz, Mexico. In 1719 it was captured by the French, but was restored to Spain in 1723. The British secured possession of the town in 1763, but in 1781 it was again captured by the Spanish. In the War of 1812 it was taken by Gen. Jackson. The United States took permanent possession of the city in 1821, in accordance with the treaty of 1819. There was a destructive fire here in 1864. Pop. 22,982.

PENSACOLA BAY: an inlet of the Gulf of Mexico in the western part of Florida, extending 25 miles inland. It is only one mile wide at the entrance between Santa Rosa Island on the east and the mainland on the west; the bar has over 20 feet of water. The bay itself is from 4 to 10 miles wide; it is land-locked and affords an excellent harbor. About 15 miles from the entrance it divides into two branches, Escambia Bay on the west, and Santa Maria de Galvez or East Bay on the east.

PENSILE, a. *pĕn'sĭl* or *pĕn'sĭl* [OF. *pensil*—from L. *pensĭlis,* hanging—from *pendĕo,* I hang: It. *pensile*]: hanging; suspended above the ground.

PENSION, n. *pĕn'shŭn* [F. *pension*, a boarding-house, a pension—from L. *pensĭōnem*, payment—from *pendo*, I weigh out: It. *pensione*]: annual allowance of money from the public purse (see CIVIL LIST) or from a private person, without an equivalent in labor or otherwise—generally in consideration of past services: V. to grant an annual allowance of money to. PEN'SIONING, imp. PEN'SIONED, pp. *-shŭnd*. PEN'SIONARY, a. *-shŭn-ă-rĭ*, receiving a pension; consisting in a pension: N. one who receives a pension; formerly, the chief municipal magistrate of a Dutch town, known as GRAND PENSIONARY (q.v.). PEN'SIONER, n. *-ẽr*, one who receives a pension; a discharged soldier who receives a pension (see PENSIONS AND PENSIONERS): in *England*, in a special sense, one of an honorable band of gentlemen attendant on the sovereign: at *Cambridge* or *Dublin universities*, a student who pays for his own board and other charges—at Oxford such a one is a *commoner*.

PENSION, n. *pâng'sĭ-ŏng* [F.—see preceding title]: a French boarding-house or school.

PEN'SIONS AND PEN'SIONERS, MILITARY AND NAVAL: annual allowances of money from the govt. to its soldiers and sailors;—and the persons receiving the same.

In the British army and navy, there are pensions for good service, for mere faithful ordinary service, for wounds, and to representatives of deceased officers. *Good-Service Pensions* are rewards to selected officers in the British navy for distinguished service. The corresponding P. in the army is called a REWARD FOR DISTINGUISHED SERVICE (q.v.). *Pensions for Long Service* are awarded in the army to non-commissioned officers and soldiers who have served 21 years in the infantry, or 24 years in the cavalry, or earlier if disabled from further service, according to the wounds, loss of health, and conduct of the pensioner. The amount varies from 1½*d.* to 3*s.* 6*d.* a day, the lower rates being mainly confined to negro pensioners from the W. India regiments. Pensioners are either *in-pensioners* of Chelsea (q.v.) or Kilmainham Hospitals, in which case they forego their proper P., and receive board, lodging, and a small sum for tobacco-money, or out-pensioners residing where they please, and drawing their pensions from the staff officers of pensioners, of whom there is one in every considerable town. These men can follow other pursuits, often do so with great success, as their military habits of regularity stand them in good stead in civil life. In particular, railways give employment to great numbers of pensioners, as signalmen, guards, etc. Pensioners in good health, and willing for such service, are enrolled in the 'Enrolled Pensioners,' which forms a defensive corps of veterans belonging to the Army of Reserve. This gives the men some addition to the pension. *Naval Pensions for Long Service* are given to petty officers, seamen, and marines under principles essentially similar to those for the army, except that there are now no in-pensioners. There are also pensions for especial bravery in action, granted with the Victoria Cross (q.v.). Pensions for *wounds* are common to both services, and are limited to officers. In the case of

common soldiers and sailors, wounds may serve to hasten or augment the P. for service (see above); but they have no distinctive P. for wounds.

Widows of commissioned and warrant officers in the army and navy receive pensions so long as they remain unmarried, provided they have been married severally 12 mos. when their husbands die, and that the latter were under 60 years of age (50 for warrant officers) when they married the claimants. Such P. is not granted if the widow be in wealthy circumstances, and lies dormant during a second marriage, though it may be revived should she again become a widow. The amount of P. varies according to rank (see RELATIVE RANK), and there are three distinct classes for each rank: 1st, When the husband was killed in battle, or died within six months of wounds received therein; 2d, When he died from some cause distinctly within the sphere of his duty, though not from wounds in action; 3d, When he died in the course of nature.

Compassionate allowances are small additional pensions granted to children of deceased officers, left in unfavorable circumstances. They vary from £5 to £40 each, and can be held by boys till 18 (unless earlier provided for), and by girls until 21, or an earlier marriage, and in some cases by other dependent relatives.

In the United States, 1776, officers serving to the end of the revolutionary war were voted half pay for 7 yrs. thereafter. This, 1780, was extended to widows and orphans of those who lost life in service. Afterward it was made a life-pension, and finally commuted to 5 yrs. full pay. Subsequently all who had been disabled in army or navy services during war, whether officers or privates, were to receive aid; and, 1818, aid was granted to veterans of the revolution who, for any reason, were in need. The pensions to revolutionary soldiers were, 1832 (nearly 50 yrs. after the war), made a fixed sum for two years or more of service, and a proportionate sum for less. The last pensioned soldier under this act died 1866. Pensions for civil service were enacted 1869, for the benefit of retiring judges of the U. S. courts; and, later for the life-saving department, etc. Survivors of the war of 1812 were pensioned 1871 (56 yrs. after the war) for 60 days' service, and 1878 for 14 days' (or their widows were pensioned). The Arrears Bill, 1879, has called forth severe animadversion. Soldiers of the Mexican war, 1887 (39 yrs. after the war) were pensioned for disability, conditioned on 60 days' service (or their widows were pensioned); and, that year Pres. Cleveland vetoed a bill granting pensions to all survivors (including those of the civil war) having served 3 months, on evidence of present disability alone, or 'hereafter.' The Dependent Pensions Bill, 1890, June 27, provides for soldiers and sailors of the civil war who served 90 days and are disabled, and for their widows, children under 16 years, and dependent parents. The following tabular statement begins 1862, after pensions were cut off from the seceding states, there having been a drop of 477 pensioners and $282,000 disbursement from 1861.

PENSIONS AND PENSIONERS.

TABLE OF U. S. PENSIONERS AND DISBURSEMENTS, 1862–1890.

Year ending June 30	No. of Pensioners.	Total Disbursements of Pension Dept.	Year ending June 30	No. of Pensioners.	Total Disbursements of Pension Dept.
1862	8,159	$ 790,819	1877	232,104	$ 28,580,157
1863	14,791	1,044,364	1878	223,998	26,844,415
1864	51,135	4,521,622	1879	242,755	33,780,526
1865	85,986	8,542,885	1880	250,802	57,240,540
1866	126,722	13,250,980	1881	268,830	50,626,538
1867	153,183	18,681,711	1882	285,697	54,296,280
1868	169,643	24,079,403	1883	303,658	60,431,972
1869	187,963	28,445,089	1884	423,756	57,273,536
1870	198,686	27,780,811	1885	345,125	65,693,706
1871	207,495	33,077,383	1886	365,783	64,584,270
1872	232,229	30,169,341	1887	406,007	74,815,486
1873	238,411	29,185,289	1888	452,557	79,646,146
1874	236,241	30,593,749	1889	489,725	89,131,968
1875	234,821	29,683,116	1890	537,944	109,357,534
1876	232,137	28,351,599			

In 1893 the number of pensioners was 966,012 and the disbursements $158,155,342; in 1896 the corresponding figures were 970,678 and $139,280,075; in 1898 they were 993,714 and $145,748,865; in 1900, 993,529 and $139,381,522; in 1901, 997,735 and $139,582,231; in 1902, 999,446, and $138,491,822; total disbursement for 40 years $2,841,048,064; 1903, 996,545 and $138,890,089; 1904, 994,762 and $142,092,819; 1905, 998,441 and $142,099,286. In 5 months after the Dependent Pensions Act was signed, 530,000 claims under the act were on file, and were said to be coming in at the rate of 10,000 a day, though it was stated that the bill was to provide for not over 300,000. Pensions are often increased by re-rating, limited now by the law to results of gun-shot wounds, and to cases of disease erroneously adjudicated, provided the appeal be made within 12 mos. after rating. Additional pension may be claimed on all the new disabilities that the applicant may have overlooked or the dept. may have ignored; lost pensions may be restored: rejected claims reopened; "charge of desertion removed" (by pension attorneys). A series of bounties, from $100 to $4,000, are open to claim by soldiers or their heirs. There is a long list of pathological sequences on which claim may be made, e.g., diseases referred to, former sunstroke, catarrh, vaccination, diarrhea, etc. Numerous private bills have been passed by congress for individual relief, or as honorary to widows of presidents, etc.

In 1862 the whole number of pension claims allowed was 462: disbursements, $790,384.76. In 1882, 27,664: disbursements, $54,296,280.54. In 1892, 224,047; disbursements, $141,086,948.84. In 1905, 50,027: disbursements, $142,099,286. Total number of claims allowed from 1861 to 1905, 1,876,096; total amount of disbursements, $3,264,130,257.90.

The classification of pensions, 1906, showed the following: Regular establishment: Army, invalids, 8,629; widows, etc., 2,345. Navy, invalids, 2,019; widows, etc., 1,199. Civil war (general law): Army, invalids, 203,550; nurses, 579; widows, etc., 83,625. Navy, invalids, 1,817; widows, etc., 1,131. Civil war (act June 27, 1896): Army, invalids, 443,327; widows, etc., 171,919. Navy, invalids, 17,751, widows, etc., 7,759. War with Spain: Army, invalids, 17,038; widows, etc., 4,715. Navy, invalids, 508; widows, etc., 260. War of 1812: Widows, 660. War with Mexico: Survivors, 2,173; widows, 3,367. The decrease in the roll June 30, 1906, was 18,155. The average annual value of each pension is $138.18. On June 30, 1906, the total number of examing surgeons, mainly organized with boards of these members each was 4,746. Pensioners dropped from the rolls during 1906 aggregated 47,444; 43,300 being adults.

PENSION LAWS.—Under existing statutes the following classes of persons are entitled to pensions.

Under sections 4,692 and 4,693, United States Revised Statutes—

1. Any officer, including regulars, volunteers, and militia, or an officer of the marine corps or any enlisted man, however employed, in the military or naval service of the United States or in its marine corps.

2. Any master serving on a gunboat, or any pilot, engineer, sailor, or other person not regularly mustered, serving upon a gunboat or war vessel of the United States, disabled by any wound or injury received, or otherwise incapacitated while in the line of duty for procuring his subsistence by manual labor.

3. Any person not an enlisted soldier in the army, serving for the time being as a member of the militia of any state under orders of an officer of the United States, or volunteered for the time being to serve with any regularly organized military or naval force of the United States, or who otherwise volunteered and rendered service in any engagement with rebels or Indians, disabled in consequence of wounds or injury received in the line of duty in such temporary service; but no claim of a state militiaman or non-enlisted person shall be valid, unless prosecuted to a successful issue prior to 1874, July 4.

4. Any acting assistant or contract surgeon.

5. Any provost marshal, deputy provost, or enrolling officer disabled by reason of any wound or injury received in the discharge of his duty to procure subsistence by manual labor.

Section 4,702—

The widows and minor children of those embraced in sections 4,692 and 4,693.

Section 4,705—

Widows of colored and Indian soldiers and their minor children.

Section 4,707—

Dependent mothers, fathers, and brothers and sisters of those embraced in section 4,692 and 4,693.

Section 4,728—

Provides pensions for officers and seamen of the navy disabled prior to, 1861, Mar. 4.

Section 4,729—

Pensions widows and minors of officers and seamen of the navy disabled prior to 1861, Mar. 4.

Section 4,730—

Pensions regulars or volunteers disabled in the Mexican war.

Section 4,731—

Pensions widows and children of regulars or volunteers who died by reason of injuries or disease contracted in Mexican war.

Section 4,732—

Pensions widows and minor children of persons engaged in Mexican and various Indian wars.

Section 4,736—

Pensions soldiers and sailors who served in the war of 1812.

Section 4,738—

Pensions surviving widows of officers, soldiers, and sailors of the war of 1812.

Section 4,741—

Pensions officers and seamen of revenue cutters who have been or may be disabled or wounded in discharge of their duty while co-operating with the navy by order of the president.

Section 4,761—

Wounded privateersmen.

Act of 1875, Mar. 3—

Pensions widows. children, dependent mothers and fathers, or orphan brothers and sisters of those soldiers who were murdered by guerillas at Centralia, Mo., in 1864.

Act. of 1887, June 29—

Pensions surviving soldiers and sailors of the Mexican war and the widows of the same.

Act of 1890, June 27—

Pensions soldiers and sailors of the war of the rebellion who served 90 days and were honorably discharged the service, and who are incapacitated for performance of manual labor, and for the widows, children, and dependent parents.

PENSIVE, a. *pĕn'sĭv* [F. *pensif*, pensive—from *penser*, to think—from L. *pensārĕ*, to weigh: It. *pensivo*, pensive]: *literally*, weighing, pondering, or considering in the mind; thoughtful and sad, or melancholy. PEN'SIVELY, ad. *-lĭ*. PEN'SIVENESS, n. *-nĕs*, thoughtfulness; seriousness.

PENSTOCK, n. *pĕn'stŏk* [*pen* 2, and *stock*]: the sluice or flood-gate of a mill-pond.

PENT: see under PEN 2.

PENT, *pĕnt*, PENTA, *pĕn'tă*, PENTE, *pĕn'tĕ* [Gr. *pentĕ*, five]: a prefix signifying 'five.'

PENTACAPSULAR, a. *pĕn'tă-kăp'sū-lĕr* [Gr. *pentĕ*, five; L. *cap'sula*, a small box]: having five cells or cavities.

PENTACHORD, n. *pĕn'tă-kawrd* [Gr. *pentĕ*, five; *chordē*, a string]: a musical instrument of five strings; a system or order of five sounds.

PENTACLE, n. *pĕn'tă-kl* [It. *pentacolo*, a talisman, a charm: Gr. *pentĕ*, five]: a five-sided head-dress of fine linen worn as a defense when invoking evil spirits; a figure composed of two equilateral triangles intersecting each other so as to form a six-pointed star, used with superstitious import by the astrologers and mystics of the middle ages.

PENTACOCCOUS, a. *pĕn'tă-kŏk'kŭs* [Gr. *pentĕ*, five; *kokkos*, a kernel]: having or containing five seeds or grains.

PENTACRINUS, n. *pĕn-tăk'rĭ-nŭs*, or PENTAC'RINITE, n. *-rĭ-nīt* [Gr. *pentĕ*, five; *krinon*, a lily]: genus of *Echinodermata*, of the order or family *Crinoideæ*, remarkable as containing the only permanently stalked Crinoideæ, or Crinoideæ believed to be permanently stalked, now known; thus the only true living representative of the fossil Encrinites (q.v.). The genus P. has a long pentangular column of numerous joints, from which there arise at intervals many whorls of unbranched arms, and which bears at its summit a disk at first divided into five radiating members, afterward branching into ten arms, each further subdivided. The whole of this skeleton is calcareous, but united by cartilages, and covered with fleshy integument. *P. Caput Medusæ*, the MEDUSA'S HEAD, is found in the W. Indian seas, and is very rare in collections, being dredged up only from waters of considerable depth; from which cause also the nature of the base of the column is not certainly known. The stem is more than 12 in. long.—The fossil species of P. are numerous in the Lias and Oolite formations. They gradually become fewer in the newer rocks.—The stalked young of *Comatula rosacea* was formerly regarded as a P., and described under the name *P. Europæus*. See CRINOIDS.

PENTAD, n. *pĕn'tăd* [Gr. *pentĕ*, five]: in *chem.*, a quinquivalent element; an element of five equivalents.

PENTADACTYL, a. *pĕn'tă-dăk'tĭl* [Gr. *pentĕ*, five; *dak'tulos*, a finger or toe]: having five fingers or toes; having a structure resembling five fingers.

PENTADELPHOUS, a. *pĕn'tă-dĕl'fŭs* [Gr. *pentĕ*, five; *adel'phos*, a brother]: in *bot.*, having the stamens arranged in five bundles or divisions.

PENTADESMA, *pĕn-ta-dĕs'ma:* genus of trees of nat. order *Guttiferæ*, to which belongs the BUTTER-AND-TALLOW TREE of Sierra Leone, *P. butyracea*, a tree 60 ft. high, producing a conical fruit of the size of a very large pear, the pulp of which abounds in a yellow oily substance, with a strong flavor, somewhat resembling that of turpentine, yet much used by the natives as an article of food.

PENTAGON, n. *pĕn'tă-gŏn* [F. *pentagone*, five-cornered: Gr. *pentĕ*, five; *gōnĭa*, a corner or angle]: a figure of five sides and five angles—if the sides are equal, it is called *regular*, if unequal, *irregular*. PENTAG'ONAL, a. *-tăg'ŏ-năl*, or PENTAG'ONOUS, a. *-tăg'ŏ-nŭs*, having five corners or angles. PENTAG'ONALLY, ad. *-lĭ*.

PENTAGRAPH, n. *pĕn'tă-grăf* [Gr. *pentĕ*, five; *graphō*, I write]: an implement for enlarging or diminishing copies of drawings.

PENTAGYN, n. *pĕn'tă-jĭn* [Gr. *pentĕ*, five; *gŭnē*, a woman or female]: a plant whose flowers have five pistils or five distinct styles. PEN'TAGYN'IAN, a. *-jĭn'ĭ-ăn*, or PENTAGYNOUS, a. *pĕn-tăj'ĭ-nŭs*, having five pistils or styles.

PENTAHEDRON, n. *pĕn'tă-hē'drŏn* [Gr. *pentĕ*, five; *hĕdra*, a seat or base]: a solid figure having five equal sides. PEN'TAHE'DRAL, a. *-hē'drăl*, or PEN'TAHE'DROUS, a. *-drŭs*, having five equal sides.

PENTAHEXAHEDRAL, a. *pĕn'tă-hĕks'ă-hē'drăl* [Gr. *pentĕ*, five; *hex*, six; *hĕdra*, a base]: exhibiting five ranges of faces, one above another, each range containing six faces.

PENTAMEROUS, a. *pĕn-tăm'ĕr-ŭs* [Gr. *pentĕ*, five; *mĕros*, a part]: in *bot.*, composed of five parts; having the elements of the floral whorls five in number, or multiples of five. PENTAM'ERA, n. plu. *-ĕr-ă*, in *zool.*, a section of the beetle tribe having five joints on the tarsus of each leg. PENTAM'ERAN, n. *-ĕr-ăn*, one of the pentamera.

PENTAMETER, n. *pĕn-tăm'ĕ-tĕr* [Gr. *pentĕ*, five; *metron*, a measure]: in *anc. poetry*, a verse of five feet: ADJ having five metrical feet.

PENTANDER, n. *pĕn-tăn'dĕr* [Gr. *pentĕ*, five; *anēr* or *andra*, a man or male]: a plant of the class PENTAN'DRIA, *drĭ-ă*, characterized by hermaphrodite flowers with five stamens. PENTAN'DRIAN, a. *-drĭ-ăn*, or PENTAN'DROUS, a. *-drŭs*, having five stamens.

PENTANGULAR, a. *pĕn-tăng'gū-lĕr* [Gr. *pentĕ*, five; L. *an'gulus*, a corner]: having five corners or angles.

PENTAPETALOUS, a. *pĕn'tă-pĕt'ă-lŭs* [Gr. *pentĕ*, five; *pet'alon*, a petal]: having five petals or flower-leaves.

PENTAPHYLLOUS, a. *pĕn-tăf'ĭl-lŭs* [Gr. *pentĕ*, five; *phullon*, a leaf]: having five leaves.

PENTARCHY, n. *pĕn'tär-kĭ* [Gr. *pentĕ*, five; *arche*, rule]: a government consisting of five persons.

PENTASEPALOUS, a. *pĕn-tă-sĕp'ă-lŭs* [Gr. *pentĕ*, five; and Eng. *sepal*]: having five sepals.

PENTASPERMOUS, a. *pĕn'tă spĕr'mŭs* [Gr. *pentĕ*, five; *sperma*, seed]: containing five seeds.

PENTASTICH, n. *pĕn'tă-stĭk* [Gr. *pentĕ*, five; *stichos*, a verse]: a poem of five lines or verses.

PENTASTYLE, n. *pĕn'tă-stīl* [Gr. *pentĕ*, five; *stulos*, a column]: an edifice having five columns in front.

PENTATEUCH, n. *pĕn'tă-tūk* [L. *pentateu'chus*—from Gr *pentĕ*, five; *teuchos*, a book; *teuchō*, I make]: the first five books of the Old Testament. PEN'TATEU'CHAL, a. *-tū'kăl*, pertaining to the Pentateuch or five Books of Moses. —*Pentateuch* is a name given by Greek translators to the five books ascribed to Moses, in Hebrew called collectively *Torah* (Law) by way of eminence, or *Chamisha Chumshe Torah* (five fifths of the Torah). *Law* is also the general name by which in both the Old and the New Test. the work or portions of it are referred to and quoted—the words 'of Moses' or 'of the Lord' being added occasionally.

The division into five portions (further divided into 50, 40, 27, 36, 34 chapters, or 12, 11, 10, 10, 11 Parshioth or Sidras respectively, by the Masoretes) is, if not original, at all events of very remote date, certainly anterior to the Septuagint. Genesis, Leviticus, and Deuteronomy, the first, third, and fifth books, form clearly defined and internally complete parts of the work as a whole, and thus, also, fix the limits of the intermediate second (Exodus) and the commencement of the concluding fifth (Deuteronomy). The chief aim of the P. being to trace the origin and history of the Hebrew people to the conquest of Canaan, and to present the theocracy founded among them, the centre is formed by the person of Moses himself, regenerator, leader, and lawgiver of the nation. Genesis, beginning with the history of the creation and antediluvian genealogy from Adam to Noah, in rapid outlines sketches the propagation of the various tribes that descended from the one man who was saved in the Deluge, but dwells with special emphasis upon Shem, from whom sprang, in the tenth generation, Abraham, progenitor of the 'people of the covenant.' The salient events in the lives of his descendants, the Patriarchs, are minutely described; and a fitting close is found in the benediction of Jacob, who, as it were, reinaugurates and confirms all his 12 sons in the covenant made between Abraham and God. Exodus, treating of the liberation of the people from Egypt; their wanderings in the desert; the promulgation of the Law, by which they became emphatically the 'holy nation' and the 'people of the Lord;' and the erection of a visible sanctuary; may be regarded as the nucleus of the work; while Leviticus, the following book, enters into the details of the legislation and the mode of worship; especially the prescriptions concerning sacrifices, festivals, ceremonial purity, and the duties of the priest: it gives but little history. The historical thread is taken up again in Numbers, the fourth book, which, also, side by side with the relation of the events between the Sinaitic period and the beginning of the 40th year after the Exodus, contains many laws explanatory of,

or complementary to, those of the former books, together with such as new circumstances had called into existence. A brief recapitulation of the preceding portions; Moses's most impressive and reiterated exhortations to keep that Law, which was now completed, and solemnly transmitted to the Levites; and the death of the great legislator himself; form the chief contents of the fifth book, or Deuteronomy. Thus, the theocratic plan of the work is carried through from beginning to end, coming out more prominently in the three intermediate books, but never entirely lost from sight. Nothing is dwelt or even touched on except that which in some way illustrates either the relation of Jehovah to the people, or of the people to Jehovah; the political, civil, and domestic laws themselves being enumerated only as bearing on the main aim and object of the work.

For the special books, see their respective titles. We have here to consider some questions relating to the work as a whole; principally the question of its authorship and history, as far as these points are not presented under GENESIS. Tradition, embodied in the earliest historical records, mentions Moses as the writer of the complete P., such as it is before us: except of a few verses, describing the last moments of the lawgiver, etc., which were ascribed to Joshua. This tradition has for many a century been almost universally accepted; though at different periods suspicions have been raised respecting this 'authenticity.' The Pseudo-Clementines, e.g., assumed that the Law, orally delivered by Moses to the Elders, had, before and after its being committed to writing, undergone innumerable changes, nay, corruptions; among these the too personal and human conceptions of God, and the unworthy traits recorded of the Patriarchs. Jerome expresses himself in a somewhat doubtful manner on the relation of Ezra as the 'redactor,' or rather 'restorer,' of the Pentateuch. Aben Ezra boldly calls several passages later interpolations, and speaks of others still more poignantly as a *Ssod*, or a 'Mystery,' i.e., as containing difficulties not to be cleared away in consonance with the common belief, which he, however, was too pious wantonly to disturb. Other voices, vaguely lifted up by more or less competent scholars, remained unheard. It was not until long after the Reformation, at the dawn of the exegetical and critical modern age, that the question whether this codex was the work of one man, or even of one age, and what share, if any, Moses had in its composition, began to be discussed seriously and on scientific grounds. Hobbes held that the P. was rather a work on, than by Moses. Spinoza came to the conclusion that to Ezra we are indebted for the book in its present shape, and that it embodies certain genuine portions, collected at a late period, together with a vast amount of later material, added at various periods subsequent to the time of the supposed author. Vitringa, Le Clerc (Clericus), Rich. Simon, and others, followed, resuming and enlarging the discussion chiefly respecting the difficulties which presented themselves in the accounts

of the creation, and the like, in Genesis. The next, indeed the most important step—because the one which at once removed the question from the field of hazy and timid speculations to that scientific basis upon which it still rests, was taken by Astruc, who, from the marked difference of the Divine names used in Genesis and the beginning of Exodus (see TALMUD: FATHERS OF THE CHURCH) came to the conclusion that these books had been worked up from different original documents, which he called Jehovistic and Elohistic respectively. See GENESIS for the development of this speculation. At the present stage of the investigation the view adopted by very many scholars is the 'complementary theory,' which assumes, with certainty, two or more authors—Jehovists and Elohists—for the whole of the first four books, at least; the fifth being by some (Delitzsch, Schulz, Kurz, etc.) still ascribed chiefly to Moses's own hand. Only a small apologetic school, of which Hengstenberg long was spokesman, still upholds the sole authorship of Moses for the entire work. The contemporary discussions on these points, which till recent years were chiefly confined to Germany, have now found their way into Britain and this country. The impulse to the controversy in Britain was given principally by Dr. Davidson, the 'Essayists and Reviewers,' and Bp. Colenso; all of whom, on the basis of the German investigations, raised some new points. Innumerable replies, by more or less competent champions, have been issued; but as yet, so far from either of the combatants having declared themselves convinced by the arguments from the other side, the controversy elicits new publications uninterruptedly.

While endeavoring to trace in outline some chief objections raised against the Mosaic authorship, and the replies thereto, we express no opinion about the superior force of the arguments on either side.

A work, alleged to be the production of one man, it is urged, first, ought to contain neither unnecessary repetitions of considerable length, nor contradictions, nor anachronisms. There ought to be a plan and a unity. Yet there can be no doubt, they say, about the fragmentary character of the P. Many portions, evidently complete in themselves, are strung together without the slightest logical sequence, nay, in unchronological order. As to repetitions and contradictions, there is, to begin with, the very history of the creation, which occurs twice in the first chapters of Genesis, is each time given differently, and in each account the Divine name is consistently mentioned in a different way. The same is said with regard to the account of the deluge, and several incidents in the lives of the Patriarchs; the important conversation between God and Moses respecting Aaron (Exod. iv. 10–16, and vi. 9); the descriptions of the tabernacle; the priestly vestments; the story of the manna as given in Exodus and Numbers, the account of the appointment of the council of the 70 elders in the same books; etc. Again, the work itself sometimes seems to indicate an author who is not the legis-

lator himself, such as the phrase of Moses being the humblest of men; the account of his own death; the passage in Genesis 'before there reigned any king over the children of Israel' (xxxvi. 31); the occurrence of the name of the city of Dan (Gen. xiv. 14, Deut. xxxiv. 1), so called only after the conquest by that tribe. In Numb. xxxii. 34, we find an enumeration of a certain number of towns and villages built by the tribes of Gad and Reuben—an event which could not have happened during Moses's lifetime; further, the frequent occurrence of the formula 'unto this day' (e.g., Deut. x. 8, where the author speaks of the institution of the Levites as being still in force 'up to this day'), etc. It is contended, also, that the language of the P. varies very little from that of the last prophets, and that it can hardly be assumed that a thousand years should have made no perceptible difference in the idiom; particularly has Deuteronomy been supposed to bear a striking resemblance, in style and language, to Jeremiah. The P. is further said to contain many facts palpably contradictory to natural laws, as they are established in the experience of the whole historical human race, and systematized by science.

Of the many ways to meet these and similar—old and new—objections to the sole Mosaic authorship, the most generally adopted is the theory of 'interpolation,' by which the Apologetic School strikes out 50 or more passages, as not belonging to the original work, but having crept in, by way of commentary, note, or explanation, in post-Mosaic times—the body of the work being thus saved, so to say, by an extensive amputation. As to the argument from the language, it is said that the P. being *the* divine book by way of eminence, and embodying the very phrases used by the Almighty, must needs have served as a model for the next thousand years; and priests and Levites, the teachers of the people, were enjoined constantly to study and read it; hence the small departure in the later writers. Arabic and Syriac, it is argued, did likewise not change essentially for many centuries—an assertion, however, which holds good only when 'many' is taken in a vague sense. That Deuteronomy differs in style and manner, is verbose, etc., is explained by Moses's advanced age. On the other hand, events apparently not in harmony with the 'natural laws,' are accepted by the orthodox simply and literally as 'miracles;' while 'conservative' rationalists of the school of Eichhorn, Rosenmüller, and others, who stand by the authenticity of the P., have been at great pains to find some kind of poetical interpretation for them.

Some of the recent attacks on the authenticity are founded chiefly on arithmetical grounds. The numbers of the people, their cattle, and the like, at various periods, do not seem to conform to the laws of natural increase, or even to the geometrical limits within which they were at times stated to have been confined. Among the direct proofs, however, proffered by the defenders of the authenticity, the following chiefly deserve attention. Deuteronomy, it is averred, can be the work only of Moses. He

speaks in it to the men whom he has led for many years, as one who has lived through all the events himself. There is no possibility of any one imitating the local coloring in such a manner. If, then, Deuteronomy must be allowed to be the work of Moses, the three preceding books, to the contents of which frequent allusion is made, must equally be supposed to be finally redacted, if not written, by the same hand; and it further follows naturally, that the introduction to these books, which is Genesis, must have emanated from it. Again, any one writing after Moses could not possibly have possessed the extraordinarily correct knowledge of contemporary Egypt and Arabia, which appears throughout the Pentateuch. A writer who might be supposed to have acquired it by study of antiquities, must, it is said, have betrayed himself on every page by inaccuracies and anachronisms. Nineveh is in Genesis a city of as yet little importance; while Resen, of which no trace is found in any other part of the Bible, is the great metropolis of Assyria of the time. Tyre, great in the days of David, and mentioned already in Joshua, is not mentioned in the P., where a later writer would certainly have spoken of it in connection with Sidon. The Canaanite gods and altars are often spoken of; never their temples, of which yet we read in Joshua. Why, then, should that very ancient author, to whom must needs be traced the Pentateuch, not be Moses himself, rather than some contemporary of Moses? The fragmentary, abrupt, and, as it were, confused character of the work, the apologists further urge, so far from testifying against Moses, confirms the tradition of his authorship. Would not a later historian have worked the mixed mass of historical, geographical, legal, and personal material into a methodical and systematical whole? Who else could have imparted to the book the impress of a diary, so to say, but the man who was in the midst of the events, jotting down all the items important either in his own individual or the national career? And who but one standing in its very centre could depict with such glowing colors the life that moved around him?—But a further direct argument for the authenticity is found by them in the very item of the language of the P. True, they say, it resembles as much as can be that of the later books, because, as we said before, it remained the classical language for all later generations; but, on the other hand, it offers certain peculiarities—such as the use of a common pronoun of the third person singular for both the masculine and feminine genders; the same term for boy and girl; and the like archaisms—all of which distinctly prove it to be a work of very much older date. The existence of an ancient Mosaic code of laws further appears proved beyond any doubt by the constant recurrence of quotations from 'the Law of Jehovah' or 'the Law of Moses' throughout the other books of the Old Testament from Joshua to Hosea. Had there in reality been no such code in existence, the authors of the different biblical works could not possibly have so unanimously spoken of it without betraying a conscious forgery somewhere. That Ezra should have been the author, or, at all

events, the refounder of the P., is equally improbable, on account of the spirit, tone, language, and all those smaller peculiarities of which mention has been made; and he would, on the other hand, never have been able so skilfully to avoid his own individual manner and style, as it appears in his own book. The Samaritan P., it is further said, which, with a very few characteristic alterations, is an accurate transcript of our P., would have been an utter impossibility, considering the hostile relations between the Samaritans and the Jews, if it had not been well known as a genuine document before the division of the empire. That Hilkiah, who is said to have *found* the Book of the Law in the temple in the days of Josiah (II Kings, xxii.; II Chron. xxxiv.), should have been its real author—an opinion first advanced by De Wette—would imply a complicity in the forgery not only on the part of Jeremiah, Huldah, and the elders, but of almost the whole people; among whom, on the contrary, there certainly seems to have been living a very vivid tradition of the former existence of the book or some of its portions at least. Moreover, had it been written first in those days, there surely would have been introduced some kind of prophetical allusion to the royal house of David, or, at all events, a pedigree and origin differing from the incestuous one given in Gen. xxxviii. Deuteronomy would altogether have changed its language about royalty (xvii. 15–20); and Joseph's tribe would not have stood out so prominently as a favored tribe. The alleged difficulties respecting the numbers are explained away more or less convincingly—in the most difficult cases, by miraculous interference. Corruptions, interpolations, and the many fates that befall ancient documents, are allowed to have crept in, in some places; though this argument is not advanced by those who hold that a special Providence watched over the Divine work. In all other respects, they hold these books are exactly as they were written by Moses under direct 'Inspiration.'—Thus far, in outline, the pros and contras most commonly adduced and most worthy of consideration.

A few rationalistic critics, however, have gone so far as to deny the very possibility of Moses having given the laws contained in the P., founding their objections on the ground chiefly that he was not likely to have been versed in the art of writing to an extent which the composition of these laws would presuppose. Egyptian characters, with which he might have been familiar, could not have been used for Hebrew composition; and the Hebrews themselves, uncultivated as they were, did not possess any characters of their own. There has only, in reply to these objections, the fact to be stated, that a soberer criticism of more recent date has found itself obliged, in deference to certain paleographical and other scientific truths, to give up most of these points; or, at all events, to found no such sweeping condemnation on those which still remain. It is now noticeable, and increasingly so—whichever of the hypotheses (against the sole Mosaic authorship) enumerated at the beginning is assumed—that the ground-work of the legislation is traced back, by

almost unanimous consent, to the historical person of Moses, who is no longer the mythical demi-god of barbarous hordes, but a man. The final redaction of these laws—of which many of later date are found wholly inconsistent with the earlier corresponding laws—as of the whole of the Pentateuch, is now, if not almost as unanimously, certainly quite generally, placed in ages long after him.

In the contemporary 'moderate' school in England and the United States, so far as may be gleaned from their writings, the following seems the prevalent opinion on the point of the Mosaic authorship: It is allowed that Moses did not write the whole of the Pentateuch, but portions of Exodus, Leviticus, and Numbers, and the whole of Deuteronomy except the account of his death, and such portions as palpably show an author who points to the imminent dissolution of the kingdom. That even the fundamental Law (Decalogue) should be found in two varying versions, they hold, strengthens rather the assumption of their genuine Mosaic authorship in some original shape. The later editor, finding two different recensions made by contemporaries or in subsequent ages, embodied them both, on account of their paramount importance, literally. Genesis was worked up from ancient documents, composed by various writers, living at various 'prehistoric' periods, either by Moses himself, or, under his supervision, by some of the elders of Israel. The first redaction of the five books as a whole took place after the conquest of Canaan, through Joshua and the elders; the second and final redaction, however, in which it received its present shape, is to be dated from the time of Ezra, after the return from the exile.

The majority of continental modern critics of the more moderate stamp—who repudiate the notion of their belonging to the advanced rationalistic party—hold opinions very different from the British and American moderates; and since they have found professed partizans in these countries, foremost of whom is Dr. Samuel Davidson, his own words are here quoted (*Introduction to the Old Testament*): 'There is little external evidence for the Mosaic authorship; and what little there is, does not stand the test of criticism. The succeeding writers of the Old Testament do not confirm it. The venerable authority of Christ himself has no proper bearing on the question. The objections derived from internal structure are conclusive against the Mosaic authorship. Various contradictions are irreconcilable. The traces of a later date are convincing. The narratives of the Pentateuch are usually trustworthy, though partly mythical and legendary. The miracles recorded were the exaggerations of a later age. The voice of God cannot, without profanity, be said to have externally uttered all the precepts attributed to Him. Moses's hand laid the foundation of the edifice of God's Word, which has grown into the proportions in which we now possess it; but he was not the first writer who penned parts of the national legends and history. He was emphatically a *lawgiver*, not a historian; a grand spiritual *actor* in the life-drama of the Israelites, who founded

their theocratic constitution under the direct guidance of the Supreme.'

Meanwhile, however the critics may settle the interesting and important question as to the sole Mosaic authorship of any or all of these books, the question of their Divine inspiration, as of their fundamental verity and value to the world, is not deeply involved therein; but is decided on other considerations than those prominent on either side in this debate.

A few words must be added respecting the use of the P. According to Deut. xxxi. 24, and following, it was preserved in the Ark of the Covenant. Every seventh year, it had to be read to the people in public; and probably the Schools of Prophets, instituted at the time of Samuel, propagated its use by copies. Moreover, certain priestly, sanitary, and other laws required constant reference to it, so that certain portions of it seem to have been widely in use at an early period. Every synagogue is, according to the traditional Law, to possess a roll of the Torah, written on parchment, and under certain regulations strictly insisted on; out of which roll certain portions are read on Sabbath and feast days; and, according to the ancient custom in Palestine, when Monday and Thursday were the market-days—when the country people came to town and the judges sat—also on those days. A smaller portion (Parasha) is read on these and on the afternoon service of the Sabbath than on the Sabbath morning service, when a whole Sidra is read, or rather chanted, according to the *Neginah*, which is note and accent at the same time. The Samaritans have, of all biblical books, adopted only the P., with slight variations (see SAMARITAN P.), their Book of Joshua being a very different work from ours; and certain very recent accounts of their possessing also other adaptations of our biblical books require confirmation. For the different translations of the P., ancient and modern, see BIBLE. The first printed ed. of the P. dates Bologna 1482, fol.. The name of commentators and writers on the whole of the P., both in and out of the church, is legion. Among the foremost, besides the church Fathers (Augustine, Jerome, Ephraem Syrus, etc.) and the mediæval Jewish commentators (Raspi, D. Kimchi, Aben Ezra), are Calvin, Luther, Grotius, Père Simon, Le Clerc, Michaelis, Eichhorn, Jahn, De Wette, Keil, Hävernick, Bleek, Hengstenberg, Ranke, Kurtz, Stähelin, Ewald, Bertheau, Colenso, Graves, Stuart, Bush, etc.

PENTECOST, n. *pĕn'tĕ-kŏst* [Gr. *pentēcostē*, the fiftieth day, with *hēmera*, day, understood—from *pentĕ*, five, and a supposed *-konta*, ten]: great Jewish festival celebrated on the 50th day after the feast of the Passover; now known in the Anglican and some other churches as Whitsuntide. PEN'TECOS'TAL, a. *-kŏs'tăl*, pertaining to Pentecost. PENTECOSTALS, n. plu. oblations at the feast of Pentecost formerly made by parishioners to their parish priest.—*Pentecost* was the Jewish name for their feast on the 50th day after the Passover, in celebration of the 'ingathering,' and in thanksgiving for the harvest: see FESTIVALS. From the Jewish use it was introduced into the Christian, and with special solemnity, as being the day of the descent of the Holy Spirit on the apostles and of the first solemn preaching of the gospel of Christ in its complete historic manifestation. From early times P. has been regarded as one of the great festivals of the Christian year, and it was chosen as one of the times for the solemn administration of baptism, in commemoration of the great baptism by the Holy Spirit and by fire, promised by Christ to his disciples, which occurred on the 10th day after his ascension. The English name of the festival, *Whit-Sunday*, is derived from the *white* robes in which the newly baptized were clad (see CANDIDATE). It is regarded as specially sacred to the Holy Spirit as a Divine Personality, to whose honor the services of the day are directly addressed. Many curious usages were anciently connected with the celebration. The dove being held as an emblem of the Holy Spirit in some churches, a figure of a dove, suspended by a cord from the ceiling, was lowered so as to alight on the high altar during the service. In others, figures of cloven tongues, or red rose-leaves, were similarly introduced. The latter practice is said to be still retained at Messina, but in general these scenic representations have been discontinued. In some places, however, in the East as well as in the West, the practice prevails of decorating the churches with evergreens and flowers, as in England at Christmas. The whole time intervening between Easter and Pentecost is celebrated in the Rom. Cath. Church with special solemnity and with some peculiar usages, and of this something is retained in the Church of England.

PENT-HOUSE, n. *pĕnt'-hows* [a corruption of OE. *pentice* or *pentis*—from OF. *appentis*, a sloping shed; L. *appendicium*, *appendix*, an appendage: It. *pendice*, any bending or down-hanging: F. *pente*, a slope—from L. *pendēre*, to hang]: a shed standing out aslope from the main building to protect a doorway, gate, window, etc. PENT-ROOF [F. *pente*, a slope, and Eng. *roof*]: a roof whose slope is wholly on one side.

PENTILE: see PANTILE.

PENTLAND Firth, *pĕnt'land fĕrth:* channel or strait between the Atlantic and German oceans, separating the mainland of Scotland from the Orkney Islands; 17 m. long, and 6 to 8 m. wide. The island of South Ronaldsay lies about seven m. from Duncansby Head. The Pentland Skerries, 5 m. n.e. of Duncansby Head, consist of two islets and of several contiguous rocks. On the larger of the islets is a light-house with two lights, 170 and 140 ft. respectively above sea-level; lat. 58° 41′ n., long. 2° 55′ w. Off the coast of Caithness, and separated from it by a channel called the Inner Sound (about 2 m. wide), is the island of Stroma; and 3 m. n.n.e. of Stroma is the islet of Swona, one of the Orkneys. On the n. side of Stroma is the small vortex or whirlpool of Swalchie, and w. of it are the breakers called the 'Men of Mey,' supposed to be produced by a current setting strongly on a concealed reef. The navigation of the P. F. is more dangerous than that of any other portion of the Scottish seas. A current from w. to e. flows through it with velocity of 3 to 9 m. an hour, and causes numerous eddies and whirlpools. It is estimated that about 4,000 vessels with cargoes pass through the firth annually.

PENT'LAND Hills: range of hills in the Lowlands of Scotland, extending n.e. from the border of Lanarkshire to the centre of the county of Edinburgh, and to within 4 m. of the city of Edinburgh; mean height above 1,000 ft.; the highest summit, Carnethy Cairn, in Edinburghshire, 1,884 ft.

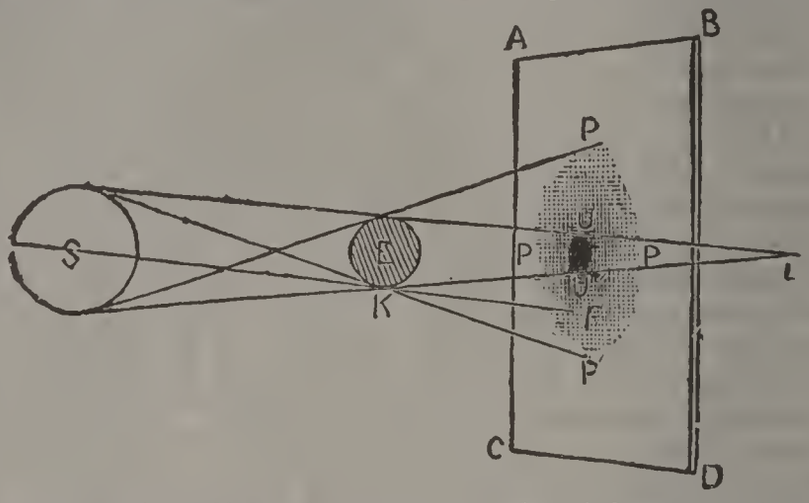
PENTREMITES, n. plu. *pĕn'trĕ-mīts* [Gr. *pentĕ*, five; *trēma*, a hole, a perforation]: in *geol.*, a genus of fossil star-fish—so called from the five conspicuous apertures in the calyx. Pentremite limestone, a term applied by Amer. geologists to the carboniferous limestone of the U. S., from the vast number of pentremites which it contains.

PENTSTEMONS, n. plu. *pĕnt-stē'mŏnz* [Gr. *pentĕ*, five; *stēmōn*, the warp in the ancient upright loom, a stamen]: a genus of very ornamental plants, with handsome variously colored flowers, ord. *Scroph'ulārĭācĕæ.*

PENULT, n. *pē'nŭlt* or *pĕ-nŭlt'*, or Penultima, n. *pĕ-nŭl'tĭ-mă*, and Penul'timate, n. *-tĭ-māt* [L. *penul'tĭmus*, the last but one—from *pēnĕ*, almost; *ultĭmus*, last]: the last syllable of a word except one. Penul'timate, a. denoting the last syllable but one of a word.

PENUMBRA, n. *pĕ-nŭm'bră* [L. *pēnĕ*, almost; *umbra*, a shadow: F. *pénombre*]: faint shadow or obscurity on the exterior of the perfect shadow in an eclipse. The name is applied also in art to that part of a picture where the light and shade appear to blend with each other.—When the shadow of an opaque object is thrown upon a surface at a little distance by a light of considerable apparent size, it is observed that the shadow is divided into two portions—a dark portion in the centre, and a lighter portion surrounding it. The former is known as the *umbra*, or complete shadow; the latter as the *penumbra*, or partial shadow. If

S be the illuminating body, E the object whose shadow is cast on the surface ABCD, it is seen that the small portion, *uu*, receives (omitting all consideration of refraction, dispersion, etc., of light) *no* light from S, while the whole surface outside of PPPP′ is completely illuminated. The



point P′ receives light from the whole of S; the point F is only half-illumined, and that by the lower part of S, the illumination of the points becoming less and less as they approach *u′*, which is unillumined. The portion within *uu′* is the umbra, and that between the boundaries PPPP′ and *uu′* is the penumbra, which, as we have seen, gradually shades from full light at the outer boundary to utter darkness at the inner, so that it is almost impossible exactly to note its limits on either side. This phenomenon can occur only when the illuminating body is of such size, real or apparent, as to make the angle P K*u′* of sensible magnitude; and the nearer the body E approaches the plane on which its shadow is cast, the larger is the umbra and the smaller the penumbra; while by increasing the distance between E and the plane, so that the point L shall fall between them, the umbra is made to vanish, and the penumbra is increased. Thus, the shadow of a man cast by the sun on the ground presents almost no penumbra; the shadow of the earth thrown by the sun upon space at the distance of the moon gives a penumbra many times as large as the umbra; and sometimes, when the moon is new at her apogee, for instance, her shadow cast upon the earth exhibits no umbra. Spectators on the earth who see a partial eclipse of the sun are situated within the penumbra; but within the umbra when they observe a total eclipse; while if the eclipse be annular, the umbra does not exist in the shadow cast by the moon on the earth's surface. See ECLIPSE.

PENURY, n. *pĕn′ū-rĭ* [F. *pénurie*—from L. *penūrĭă*, need of anything: It. *penuria*]: want of the necessaries of life; need; poverty. PENURIOUS, a. *pĕ-nū′rĭ-ŭs*, excessively saving in the use of money; affording little; niggardly. PENU′RIOUSLY, ad. *-lĭ*. PENU′RIOUSNESS, n. *-nĕs*, the state or quality of being penurious; a sordid disposition to save money; parsimony.—SYN. of 'penurious': sparing; mean; scant; parsimonious; saving; economical; covetous; miserly.

PENZA, *pĕn'zâ:* central govt. of European Russia, between the govt. of Nijni-Novgorod on the n. and that of Tambov on the w.; 15,000 sq. m. The surface is in extensive and elevated plains, marked occasionally with ridges of low hills. The rivers are tributaries of the Don and Volga, and three, the Khoper, the Soura, and the Moksha, are navigable. The climate, though rather cold in winter, is temperate, agreeable, and healthful. The soil, mostly of black earth, is extremely fertile; and agriculture is the principal employment. Grain of different kinds, leguminous plants, beet-root, flax, hemp, tobacco, and hops are principal products. Much of the grain is used in the numerous distilleries, and considerable quantities of it are exported to the neighboring governments. About one third of the entire area is covered with forests, some of which consist entirely of oak. The manufactories are centred chiefly in the towns; cloth and leather are the principal articles made. Commercial improvement of the government is hindered by lack of direct means of communication with the consuming districts. The principal towns are Penza, Mokshansk, and Saransk. Pop. of govt. (1887) 1,549,969; (1890) 1,596,500; (1897) 1,491,215.

PEN'ZA: town of European Russia, cap. of the govt. of P., on the Soura, 220 m. s.s.e. of Nijni-Novgorod. It was founded in the middle of the 17th c. as a defense against Tartar invasion, is a handsome town, occupying an elevation, and containing 19 churches, 2 convents, many gardens, a large park, with a beautiful fruit-garden and a horticultural school. There are cloth-factories, iron-works, tanneries, soap-boiling and candle-making establishments. The principal articles of commerce are corn and timber, which is floated down the Soura during the spring. Pop. (1881) 41,650; (1887) 46,221; (1897) 61,851.

PENZANCE, *pĕn-zăns':* market and sea-port town, and municipal borough of England, county of Cornwall; on the n.w. shore of Mount's Bay, 22 m. w.s.w. of Falmouth. It is the most westerly town in England—the light-house on its pier being in lat. 50° 7′ n., long. 5° 28′ w. The town, on a finely-curved shore, surrounded by rocky eminences, and in a fertile district, is exceedingly picturesque in situation; and is noted for its mild though moist climate. Its esplanade, one of the finest in w. England, commands charming land and sea views. The chief buildings, mostly of granite, are the town-hall and corn-market, surmounted by a dome, and the chapels of St. Paul and St. Mary. At P. is a statue to Sir Humphry Davy. There are numerous boarding-houses for visitors attracted hither by the temperate and equable climate, by the beauty of the neighboring scenery, and the curiosities of the district of Land's End. Woolen yarns and cloths are manufactured; the fishery employs more than 2,000 persons; agricultural produce, pilchards, and tin and copper ores from the mines of the vicinity are exported; and timber, iron, hemp, and hides are chief imports. A new floating dock was opened here 1882. One of the Atlantic cables to America comes ashore at P. In 1880 there

entered the port 789 vessels, of 65,671 tons; cleared 738, of 59,261 tons. P. was laid in ashes by a party of marauding Spaniards 1595, and was sacked by Fairfax 1646. Pop. (1871) 10,414; (1881) 11,684; (1891) 12,448.

PEON, n. *pē'ŏn* [Pers. *piyāda*, a foot-soldier, a pawn at chess—from *pai*, the foot]: one travelling on foot; a foot-soldier in India; a native constable; a day-laborer; in *Sp. Amer.*, one bound to forced labor; a pawn at chess. PE'ONAGE, n. *-ŏn-āj*, a form of servitude or compulsory labor formerly existing in Mexico.

PE'ON (wood): see CALOPHYLLUM.

PEONY, n. *pē'ō-nĭ* [L. *pæōnĭă*, so named from its supposed medicinal properties, *Pæon* being the physician of the gods: Gr. *Paiōn*, the god of healing], (*Pæonia*): genus of plants of nat. order *Ranunculaceæ;* having large flowers, with five persistent, unequal, leafy, and somewhat leathery sepals, 5–10 petals, many stamens, and 2–5 germens, which are crowned with a fleshy recurved stigma. The leaves are compound, the leaflets often variously and irregularly divided. The fibres of the root are often thickened into tubers. The species are large herbaceous perennials, or rarely half-shrubby ; natives of Europe, Asia, and n.w. America. For the beauty of their flowers some of them are much cultivated in gardens, particularly the COMMON P. (*P. officinalis*), native of the mountain-woods of s. Europe, with carmine or blood-red flowers. A variety with double flowers is common.—The WHITE P. (*P. albiflora*) is another favorite species, native of central Asia: its flowers are fragrant.—The TREE P., CHINESE P., or MOUTAN (*P. Moutan*), is a half-shrubby plant, native of China and Japan. In favorable circumstances it attains a very large size and a height of 12 ft. or more. It has been long cultivated in China and Japan; and is now also a favorite ornamental plant in s. Europe and in s. England and Ireland ; but the late spring-frosts in north temperate countries are injurious to it, though it can bear severe frost in winter, when vegetation is at a stand. It flowers in spring. The varieties in cultivation are numerous. It is propagated by cuttings, also by grafting. Its germens are surrounded by a cup-shaped laciniated membrane.—The roots of most of the peonies have a nauseous smell when fresh, and those of the Common P. were in high repute among the ancients as an antispasmodic, but their medicinal properties are now utterly disregarded. The globose, shining black seeds of peonies were formerly, in some countries, strung into necklaces, and hung round the necks of children, as *anodyne necklaces*, to facilitate dentition. The Daurians and Mongolians use the root of *P. albiflora* in their soups, and grind the seeds to mix with their tea.

PEOPLE, n. *pē′pl* [F. *peuple;* OF. *pueple;* L. *populus,* the people: It. *popolo;* W. *pobl,* the people: comp. Gael. *pobull*]: the body of persons who compose a community; the multitude; the commonalty; persons in general; inhabitants; a name applied to a separate tribe or nation. V. to settle with inhabitants. PEO′PLING, imp. *-plĭng.* PEO′PLED, pp. *-pld:* ADJ. stocked with people. ONE'S PEOPLE, or ONE'S OWN PEOPLE, in *Scrip.,* ancestors; relations; kindred.

PEOPLE'S PARTY OF THE UNITED STATES, or POPULISTS: see POLITICAL PARTIES.

PEORIA, *pē-ō′rĭ-a:* city, cap. of Peoria co., Ill.; on the Iowa Central, the Chicago Burlington and Quincy, the Chicago Rock Island and Pacific, the Jacksonville Southeastern, the Lake Erie and Western, the Ohio Indiana and Western, the Peoria and Pekin Union, the Peoria Decatur and Evansville, the Rock Island and Peoria, the Toledo Peoria and Western, and the Terre Haute and Peoria railroads, and on the Illinois river, at the s. extremity of Peoria Lake (q.v.), about 160 m. s.w. from Chicago, with which it is connected by the Illinois and Michigan canal. It is built on a sandy plateau, bounded by bluffs 180 ft. in height. There are churches representing all the principal denominations; a high school and other public schools, business colleges, free German schools, besides schools under the supervision of various religious denominations; a fine public library with 80,000 volumes and several scientific and educational societies; an active branch of the Young Men's Christian Assoc.; several hospitals; monthly, weekly, and daily newspapers, five of which are in German; savings banks, private banks, and national banks. There are loan and homestead associations and an efficient board of trade. There is an electric street-car service; the streets are well paved and are lighted with gas and electricity; a new system of water-works costing about $2,000,000 has been established; and there are several artesian wells, the latter supplying large quantities of mineral water. The fire dept. is well organized and there is an efficient police force. Among the principal buildings are the union depot, U. S. court-house, board of trade building, hotels, opera-houses, the high-school building, the Rom. Cath. cathedral, and many churches. The manufactures are extensive and varied. In 1900 there were 871 establishments, employing $27,971,613 capital and 8,022 persons, and yielding products worth $48,871,596. The industries of P. include extensive distilling, the manufacture of agriculture implements, furniture, automobiles, paper, straw board, beer, glucose, starch and carriages and wagons. Meat packing and distilling are among the leading industries of P. It is an important shipping point for grain. P. is the seat of the Bradley Polytechnia and Spalding institutes. Its splendid railway facilities and its water communication with the Great Lakes and the Gulf of Mexico make the city an important point of shipment for the vast quantities of grain grown in

the surrounding country. There are several elevators with total storage capacity of more than 2,500,000 bushels. There are also large stock-yards and several packing-houses. In the wholesale trade a vast business is transacted in agricultural implements, leather and shoe findings, lumber, candy, groceries, paper, blank books, stationery, and drugs. Other lines also are largely represented. Large quantities of bituminous coal are obtained in the immediate vicinity, and delivered in the city at only a slight advance on the cost of mining. The city is well drained; there are a number of parks, one of which has an area of 35 acres; the surroundings are pleasant; and the location, as indicated by the death-rate, is one of the most healthful in the country.—Very near the site of Peoria a trading post was established and a small fort built by La Salle 1680. In 1763 a company of French people settled a little above the present location of the city, but 1778 the settlement was moved about a mile down the river and became known as La Ville de Maillet, being named for its principal founder. On this site Fort Clark was erected by U. S. soldiers 1812. The fort was burned 1819, in which year the first American settlers arrived. The county of P. was organized 1825, the town was laid out the following year and, though the pop. was less than 100, articles of incorporation were secured 1831. In 1845 a city charter was obtained. Pop. (1870) 22,849; (1880) 29,259; (1890) 41,024; (1900) 56,100; (1910) 66,959.

PEO'RIA LAKE: expanded portion of the Illinois river, in the State of Ill., separating Woodford and Tazewell counties from Peoria county. Its length is about 20 m., and it ranges from ½ m. to 2½ m. in width. The city of Peoria (q.v.) is at the s. end of this lake.

PEPE, *pā'pā*, GABRIELE: 1781–1849; b. Bojano, in the present province of Molise, Italy. He took service in the Franco-Neapolitan army, was consequently exiled at the fall of the new govt.; served in the Italian legion in the French army under King Joseph in Spain with great distinction, and with Murat; received command of a province, and afterward of the garrison of Syracuse. He was a zealous adherent of the revolutionary party 1820; and at the downfall of the constitutional govt. he was seized by the Austrians, and imprisoned two years at Olmutz, in Moravia. Afterward a bitter controversy with Lamartine, then French chargé d'affaires in Tuscany, who had spoken slightingly of Italian patriotism, resulted in a duel, followed by an apology from the poet. He died at Bojano.

PE'PE, GUGLIELMO: 1782–1855; b. Squillace; cousin of Gabriele P. After attaining high rank in the French army of Catalonia, he returned to Naples to support Murat. In 1818 he rooted out the nests of brigands who infested the provinces of Avellino and Foggia, and after the insurrection of 1820, was for some months the most influential man in Naples; but was defeated by the Austrians at Rieti, 1821, Mar. 7, and forced to flee to Spain. He lived many years in England, afterward removing to Paris. In 1848 he returned to Naples, welcomed with enthusiasm; and the king gave him command of the Neapolitan contingent against Austria. Disregarding his orders to return and put down the insurgents in Calabria, he turned with 2,000 men to the defense of Venice, of whose army he had been elected commander-in-chief; but all his courage and energy, with his small force, were in vain. Venice fell; P. fled and reached Paris. He died at Turin. He left several works, chief of which are, *Relation des Evenements Politiques et Militaires de Naples en* 1820 *et* 1821 (Paris 1822, in Italian and French), and *Histoire des Revolutions et des Guerres d'Italie en* 1847, 1848, *et* 1849 (Paris 1850). A statue of him has been erected in Turin.

PEPERINO, n. *pĕp-ĕ-rē'nō* [It. *peperino*—from *pepe*, pepper]: an Italian name for a light, porous, brown volcanic rock, formed by the cementing together of sand, scoriæ, cinders, etc., so called from the peppercorn-like fragments of which it is composed. It designates, in the usage of some geologists, the brown tuffs, derived from augitic rocks, in distinction from the ordinary tufas, which name they confine to the lighter-colored pumiceous rocks that have more trachyte in their composition.

PEPIN, *pĕp'ĭn*, F. *p. h-păng' :* name of several distinguished members of the Carlovingian family (see CARLOVINGIANS).—The first was PEPIN LE VIEUX ('the Old') or PEPIN DE LANDEN; of Brabant origin; d. 639: he took his designation from Landen (now in Liége, Belgium). Rebelling with others of the great lords of Austrasia against the rule of Brunehaut, regent for the youthful king, he offered the crown to Clotaire II., King of Neustria, who, in reward of his services, created P. *maire du palais* of Austrasia, an office which he continued to hold during the two following reigns. His administration was directed to the preservation of the power and integrity of the Austrasian kingdom, and though, by opposing the various schemes of centralization proposed by the king, he fell under the royal displeasure, his conduct gained for him favor and influence with the Austrasian chiefs; his power and wealth were greatly increased, and a broad and firm path to political supremacy was laid for his descendants.—His son, GRIMOALD, who succeeded him as *maire du palais*, incautiously attempted to gather the fruits of his father's schemes before they were ripe, and suffered for his folly: both he and his son Childebert were strangled in prison (656) by order of Clovis II.

Pepin 'the Old' left by his daughter a grandson, PEPIN LE GROS or PEPIN D'HERISTAL (d. 714), who was elected by the Austrasian nobility as their chief, to protect Austrasia against the machinations of Elroin, the able *maire* of Neustria. His first step was to rid himself of the Merovingian king who nominally ruled over Austrasia; which was effected by obtaining the condemnation of the unfortunate monarch, Dagobert II., by a council of bishops, and then putting him to death. From this time the Merovingian rule in Austrasia ceased. P. was now sole ruler, but his ambition did not stop here; he had resolved on the ruin of the Merovingian monarchs, and accordingly levied a large army for the invasion of Neustria. Elroin, on his side, was equally resolved to humble the territorial aristocracy and support the throne; and advancing into Austrasia, his army came in sight of P.'s at Loixi. In the battle (680) which ensued, P.'s army was totally defeated, his brother and co-ruler, Martin, was taken prisoner and put to death, and he himself narrowly escaped. Elroin, however, was soon afterward assassinated, and his successor, Warato, signed a treaty of peace. The incapacity and tyranny of Warato and his successor, Berthaire, discontented the Neustrian nobles, who went over to P., and by this accession of power enabled him to resume the offensive. Neustria was immediately invaded, and a bloody but decisive battle at Testry (687) freed P. of his opponent Berthaire, who was left dead on the field, and placed Neustria at his feet. Showing moderation in the midst of triumph, and perceiving that he could not place on the throne a more obedient servant than Thierry III., then king of Neustria, P. caused him to be proclaimed king of

Austrasia also, but reserved for himself the actual sovereign power, wielding the sceptre though declining the crown. From this time he ruled the whole of France (Austrasia in his own right by his election as Duke, and Neustria as *maire du palais*) with energy, and undisturbed by any internal commotion, during the lives of three other 'fainéant' kings, till his death. He had made several campaigns (689–708) against the Frisians, but that valiant and independent race was not thoroughly subdued for some time afterward. P. had two legitimate sons, who died before him, and an illegitimate son, Charles, subsequently known as Charles Martel (q.v.), who succeeded to his power.

The third who bore this name was PEPIN LE BREF, King of the Franks (d. 768, Sep.—reigned 752–768); younger son of Charles Martel. At the death of his father 741, he received Neustria and Burgundy; Austrasia, Thuringia, and Suabia being the heritage of his elder brother Carloman. Aquitaine was nominally a part of P.'s dominions, though, as it was really independent under its own duke, he made several attempts to subdue it; but the duke was able to hold his own against both P. on the one hand and the Arabs (from Spain) on the other. The farce of governing the country in the name and as the chief minister of the Merovingian sovereign was still kept up, though P. was eagerly longing for an opportunity to assume the crown; but the time was inopportune, as no sooner was the restraint of Charles Martel's iron hand removed by death, than revolts broke out in all quarters among the Franks, Germans, Bavarians, and Gascons. The country, by the united exertions of P. and Carloman, was restored to tranquillity about 745. Those princes who had excited the insurrection were mostly deposed and otherwise punished, and the Duke of Aquitaine was compelled to acknowledge at least the nominal sovereignty of Pepin. In 747 Carloman bade adieu to power, and retired into a convent, leaving his government to his sons, who were immediately dispossessed by Pepin. After crushing a rebellion of Saxons and Bavarians, P. began to carry out his favorite project of dispossessing the Merovingian dynasty of even the semblance of authority, and of originating in person a new royal dynasty. To gain his point, he flattered the clergy, then the most influential body in France; and as they had been despoiled by Charles Martel for the behoof of his warriors, a moderate degree of kindness and generosity on the part of P. contrasted him so favorably with his father that the clergy at once became his partizans. So did the pope, who, feeling the importance of securing the aid of the powerful Frankish chief against the Lombards, then masters of Italy, released the Franks from their oath of fidelity to Childeric, the Merovingian monarch. On learning this, P. at once caused himself to be elected king by the assembly of estates at Soissons, and was consecrated by the bp. of Mayence 752, March. Chil-

deric retired to a convent, where he died 755. P. was the first Frankish monarch whose election received the sanction of the pope, and who was consecrated to his high dignity; and these solemn ceremonies put the crown to a great extent at the mercy of the clergy, who from this time took political rank in the state. The practice, too, followed by P. and his predecessors in office, of gaining partizans by granting particular fiefs to various chiefs, greatly strengthened the feudal system, and proportionally weakened the royal power. This effect, however, did not show itself till after the subsequent reign of Charlemagne, on account of the personal genius of these two rulers. P. was soon called to aid the pope against the Lombards, and, marching into Italy at the head of a large army, he compelled Astulf, Lombard king, to retire from the siege of Rome, and restore several cities which had previously belonged to the Greeks: these were now handed over to the pope. He had hardly returned to France when he was anew summoned (755) to Italy, the Lombards having broken their engagements. This time he took Ravenna, Emilia, the Pentapolis, and the duchy of Rome, from the Lombards, reuniting them to the Holy See. After the settlement of affairs in Italy, the turbulent nations on his e. frontier demanded his attention. The Saxons and other German tribes were defeated (757), their country cruelly ravaged, a heavy tribute exacted, and numbers of captives and hostages taken. Resolved to unite the whole of Gaul under his authority, he eagerly accepted the invitation of the Visigoths of Septimania to aid them against the Arabs who had taken possession of the country; and after a war of many years' duration, Narbonne, last of the Arab strongholds, was taken, and the country, freed of these invaders, at once acknowledged P.'s authority. The remaining years of his reign were occupied in reducing the independent monarchy of Aquitaine, which was not accomplished till, after nine years (760–768) of desolating warfare, P. obtained the assassination of his opponent, Duke Waifre, whose partizans then laid down their arms, surrendering to the Frankish monarch the vast provinces which stretch from the Loire to the ocean and the Pyrenees. Shortly after this conquest, P. died of dropsy. He was a most active, enterprising, and, in general, fortunate prince; he established the unity of the Gallic nation, and protected it, as far as could be done, by invading and ravaging the territories of the neighboring nations, though he also introduced elements of weakness into its constitution which deplorably reduced the authority of his successors.

PEPIN, *pĕp′ĭn* or *pĭp′ĭn*, LAKE: expanded portion of the Mississippi river between the states of Wis. and Minn., separating Pierce and Pepin counties in Wis. from Goodhue and Wabasha counties in Minn. Its length is 27 m., and it varies from two to nearly three m. in width. It is in the midst of a beautiful and picturesque region. In some portions, the limestone bluffs which rise from a large portion of the shores reach a height of about 400 ft., giving an impressive scenery. The lake is a noted resort for fishermen, but is sometimes dangerous of navigation when strong winds sweep down between its steep banks.

PEPO, n. *pē′pō*, or PEPONIDA, n. *pĕp′ŏn-ī′dă* [L. *pepo*, a gourd—from Gr. *pepōn*, a kind of melon—from Gr. *pepōn*, ripe, mellow, as applied to fruit]: the fruit of the melon, cucumber, and other *Cucurbitaceæ*.

PEPPER, n. *pĕp′pėr* [Gr. *peperi*; L. *piper*; It. *pevere*; F. *poivre*, pepper]: pungent spice, much used as a seasoning when ground to a powder; both the black and the white pepper of the shops are the product of *Piper nīgrum*, ord. *Piperācĕæ* (see below): V. to sprinkle with pepper; to pelt; to mangle or pierce with a number of missiles, as with shot. PEP′PERING, imp.: ADJ. hot; fiery; angry: N. a pelting with many shot or blows. PEP′PERED, pp. *-pėrd*. PEP′PERY, a. *-pėr-ĭ*, hot; pungent; irascible. PEPPER BOX, a box for pepper. PEPPER-BRAND, a kind of mildew or blight that affects corn. PEPPER-CAKE, a kind of gingerbread. PEPPERCORN, the berry or fruit of the pepper-plant: hence (from its smallness), a thing of little value or importance. PEPPERCORN RENT, nominal rent. PEPPER DULSE, the *Lauren′cĕă pinnatif′ĭdă*, ord. *Algæ*, an edible sea-weed. PEPPERGRASS, or PEPPERWORTS, the ord. *Marsilĕācĕæ* or *Rhizōcar′pĕæ*; popular names of some pungent-tasted plants, as the *Lepĭdĭum satīvum*, or garden-cress, ord. *Crucif′ĕræ* (see CRESS).

PEP′PER (*Piper*): genus of plants of nat. order *Pipĕraceæ* (q.v.), which genus formerly included the whole of that order; but, as now limited, consists of plants with woody stems, solitary spikes opposite to the leaves, and covered with flowers on all sides, the flowers mostly hermaphrodite. The most important species is COMMON P., or BLACK P. (*P. nigrum*), native of the E. Indies, now cultivated also in many tropical countries, and extensively in parts of America; its fruit being the most largely used of all species. It is a rambling and climbing shrub, with smooth and spongy stems, sometimes 12 ft. long, and broadly ovate, acuminate, leathery leaves. The fruit is about the size of a pea, of bright-red color when ripe, not crowded on the spike. In cultivation, the P.-plant is supported by poles, or by small trees planted for the purpose, as it requires a certain degree of shade; and different kinds of trees are often planted for this purpose in India. It is propagated by cuttings, comes into bearing in three or four years after

it is planted, and yields two crops annually for about 12 years. When any of the 'berries' of a spike begin to change from green to red, all are gathered, as when more fully ripe they are less pungent, besides being apt to drop off. They are spread on mats and separated from the spikes by rubbing with the hands or by treading with the feet, after which they are cleaned by winnowing. The *Black P.* of commerce consists of the berries thus dried, which have become wrinkled and black; *White P.* is the seed freed from the skin and fleshy part of the fruit, to effect which the dried fruit is soaked in water and then rubbed. White P. thus prepared is of whitish-gray color, but frequently undergoes a bleaching by chlorine, which improves its appearance at the expense of its quality. Black P. is much more pungent than White P., the essential constituents of the spice being more abundant in the outer parts of the fruit than in the seed. P. depends for its properties chiefly on an acrid resin and an acrid volatile oil; it contains also a crystalline substance called *Piperin*.—The fruit of *Piper trioicum*, a species very similar to the Common P., is more pungent: it is cultivated in parts of India.—The fruit of other species of *Piperaceæ* is used as pepper in their native countries—that of *Cocobryon Capense* at the Cape of Good Hope; that of *Peltobryon longifolium*, of *Artanthe crocata*, of *A. trichostachya*, and of *Serronia jaborandi* in S. America.—*P. amethysticum*, or Ava pepper-shrub, is sometimes called *Long Pepper:* from it an intoxicating beverage is obtained, and its roots are narcotic. *Chavica Roxburghii* and *C. officinarum* yield the Long Pepper of druggists: they have woody climbing stems, solitary spikes opposite to the leaves, diœcious flowers, and the fruits so close together on the spikes as in ripening to become a compact mass. The spikes are gathered unripe, dried in the sun, and used in pickling and for culinary purposes, also in medicine for the same purposes as Common Pepper: they have been generally reputed more pungent than Common Pepper. *C. Roxburghii* is cultivated in Bengal and the Circars, where it is called *Pippul; C. officinarum* in the Dutch E. Indian colonies. The root and thickest part of the stem of *C. Roxburghii* are extensively used in India as a stimulant medicine; and are cut into small pieces, dried, and brought to the market under the name *pippula moola*.

P. acts on the skin as a rubefacient and vesicant, and is used for this purpose in a powdered state, moistened with some kind of alcoholic spirit. It is employed also as a local stimulant in relaxation of the uvula, and is applied in the form of ointment to ringworm. Taken into the stomach in minute quantities, it is a pleasant stimulant, but in large doses it produces great pain and irritation. The quantity used, however, by the natives of hot climates much exceeds anything known among Europeans, and the effects are evidently beneficial, rather than injurious. The chief use of P. is as a spice and condiment.

PEPPER.

Pepper was known to the ancients: Hippocrates employed it as a medicine; and Pliny expresses his surprise that it should have come into general use, considering its want of flavor. In the middle ages, pepper was one of the most costly spices, and in the 13th c. a few pounds of it were reckoned a princely present. The quantity now exported to Europe and N. America is immense; but there are no means of exactly ascertaining how much of the pepper of commerce is the product of *Piper nigrum*, or indeed of the *Piperaceæ*, and how much —though certainly it is not a large proportion of the whole—is the product of species of *Capsicum*.

The name of pepper is popularly given to substances possessing a pungency resembling that of pepper, though produced by very different plants. Thus, CAYENNE PEPPER is the product of specie of *Capsicum*, of nat. order *Solanaceæ;* JAMAICA PEPPER (or PIMENTO), of species of *Eugenia*, of nat. order Myrtaceæ; and GUINEA PEPPER, or MELEGUETTA PEPPER, of species of nat. orders *Scitamineæ* and *Anonaceæ*. See CAPSICUM; PIMENTO; GRAINS OF PARADISE; GUINEA PEPPER.

PEPPER, GEORGE DANA BOARDMAN: American educator and theologian: b. Ware, Mass., 1833, Feb. 5. He graduated from Williston Seminary, Easthampton, Mass., in 1853; from Amherst in 1857, receiving the degree of D.D. in 1882; from Newton Theological Institution in 1860, which conferred upon him the degrees of D.D. in 1866 and LL.D. in 1890. Colby University and Lewisberg University in 1882 also conferred these degrees. After completing his studies, he became pastor of the First Baptist Church of Waterville, Me., where he remained for five years, from there going to Newton Theological Institution as professor of ecclesiastical history, occupying that position until 1867. In 1868 he became professor of systematic theology in Crozer Theological Seminary, and served in that capacity until 1882, in which year he received a call to the presidency of Colby University. Ill health caused him to resign from his duties as president in 1889, and for three years he traveled. Upon his return in 1892 he was appointed to the chair of Biblical Literature in Colby University, a position he held until 1900. He has published *Outlines of Theology* and written numerous articles for theological reviews.

PEPPER, GEORGE WHARTON, AB., LL.D.: American lawyer and author: b. Philadelphia, Pa., 1867, March 16. After graduating from the University of Pennsylvania in 1887, he took a two years' course in law there, and was admitted to the bar in 1889. He practised law until 1893, when he was appointed by Algernon Sydney Biddle professor of law in the University of Pennsylvania, a position he still occupies. He has written: *The Borderland of Federal and State Decisions* (1889); *Pleading at Common Law and Under the Codes* (1891); *Digest of*

the Laws of Pennsylvania, 1700–1901, and *Digest of Decisions and Encyclopædia of Pennsylvania Law*, 1754–1898 (with W. D. Lewis, 1902).

PEP'PER, John Henry: English chemist and mechanical inventor: b. Westminster, England, 1821, June 17; d. Leytonstone, Essex, England, 1900, March 29. He was appointed analytical chemist at the Royal Polytechnic in 1848, but is best known as the improver and exhibitor of 'Pepper's Ghost,' in its earliest form, the invention of Henry Dircks, a device for presenting on the same stage living persons and phantoms as acting simultaneously. Pepper traveled with this invention in the United States and Australia, and became public analyst in Brisbane, Queensland. He published: *Scientific Amusements for Young People* (1861); *Cyclopædic Science Simplified* (1869); *The True History of Pepper's Ghost* (1890); etc.

PEPPER, William: American physician: b. Philadelphia, Pa., 1843, Aug. 21; d. Pleasanton, Cal., 1898, July 28. He was graduated from the University of Pennsylvania in 1862, and from its medical department in 1864. In 1868–70 he was lecturer there on morbid anatomy, on clinical medicine in 1870–6; and was professor of clinical medicine in 1876–87, when he was appointed professor of the theory and practice of medicine. From 1881–94, when he resigned, he was provost of the university, and under his administration the institution made phenomenal progress, the number of instructors increased from 88 to 268, the material equipment and endowment rose from $1,600,000 to more than $5,000,000, many new departments were added, and through his efforts the university hospital was established. He founded the Philadelphia *Medical Times* and edited it in 1870–71; was one of the founders of the Pennsylvania Museum and School of Industrial Art; through his efforts the course of study in medicine was extended to four years; and an endowment fund for the medical department was established and received a gift of $50,000 from him on his resignation. He was medical director of the Centennial Exhibition of 1876 and was prominently connected with the leading medical organizations of the country. He published: *Trephining in Cerebral Disease* (1871); *Higher Medical Education* (1877); *Phthisis in Pennsylvania* (1886); *A Text-book on the Theory and Practice of Medicine* (1893); etc. Consult the biography of F. N. Thorpe (1904).

PEPPERELL, *pĕp'ĕr-ĭl*, Sir William: colonial general and governor: 1696, Jan. 27—1759, July 6; b. Kittery Point, Me., near the present boundary of N. H. His youth was passed in mercantile business. At about 30 yrs. of age he became member of council for the province of Massachusetts, and continued in that office until he became governor, 1756–58. He was chief-justice of the court of common pleas 1730; led the expedition against

Louisburg 1745; was made baronet; rose from colonel to major-general 1755, and to lieutenant-general 1759. He was author of *Conference with the Penobscot Tribe* (1753); and his life, by Usher Parsons, was published 1855. His grandson, baronet, took the side of the king in the revolutionary war, and lost his estates by confiscation.

PEPPERMINT, n. *pĕp'pĕr-mĭnt* [*pepper*, and *mint*]: aromatic herb; the *Mertha piperīt;* ord. *Labĭātœ* (see MINT). There are 17 varieties of the *mentha* genus noted by various writers, but by far the most important and the only one cultivated or distilled in a large commercial way in Europe or America is the true peppermint plant, *Mentha Piperita.* Peppermint, as is well known, is cultivated chiefly for its 'essential oil,' in which are secreted the aroma and virtues of the entire plant. This exists in minute microscopic cells in the leaves and blossoms. Distillation is effected by placing the plants which have been harvested and dried, in large vats, thoroughly packed and closed with air-tight covers, steam being admitted to the bottom of these vats by means of pipes and valves. The oil cells are ruptured by the heat, the oil escaping upward with the current of steam. The steam thus impregnated with oil flows through condensers where it is converted into oil, and water, from thence flowing into the 'receiver,' where the oil, which is lighter, floats upon the top, while the water settles below and is again forced into the boiler to be reconverted into steam for successive charges. The product thus obtained is the crude or 'natural' oil; but this although 'pure' contains some resin extracted from the stems, and some approximate hydrocarbons. The quality is consequently greatly improved by an intelligent 'fractional distillation' by which the objectionable properties may be separated, the refined product being the 'quintessence' of the plant, with a rich and mellow aroma.

PEP'PER-POT: West Indian dish of which Casareep (q.v.) is a principal ingredient; and with it flesh or dried fish, vegetables, chiefly the unripe pods of the okra (see HIBISCUS), and chillies (see CAPSICUM).

PEP'PER-ROOT (*Dentaria diphylla*): perennial herbaceous plant, of nat. order *Cruciferœ*, native of N. America, with pairs of ternate leaves and racemes of white flowers: the root of which has a pungent, mustard-like taste, and is used as a condiment.

PEPPER-TREE, PERUVIAN MASTIC-TREE, or PEA-TREE: several species of the genus *Schinus* of the order *Anacardiaceœ*. Only two of the 17 species are cultivated. In California they are popular as far north as San Francisco. *Schinus molle* is the commoner species. It is an evergreen tree 20 or more feet high with rounded top, pendulous branches, and yellowish-white flowers in conical panicles followed by fruits about the size

of peppercorns. The narrow leaves are rich in a resinous fluid which they discharge into the air.

PEPSIN, or PEPSINE, n. *pĕp'sĭn* [F. *pepsine*—from Gr. *pessō*, I digest; *pepsō*, I shall digest; *pepsis*, a digesting, a cooking]: peculiar nitrogenous substance, forming, with dilute hydrochloric acid, the active constituent of the gastric juice in animals generally. According to Schmidt's analysis, it contains 53.0 per cent. of carbon, 6.7 of hydrogen, 17.8 of nitrogen, and 22.5 of oxygen; hence in its ultimate composition is closely allied to albumen. As obtained from the walls of calves' or pigs' stomachs, it is used in the form either of powder or solution, for cases of disordered digestion from deficient or imperfect secretion of gastric juice, and in convalescence from typhoid and other fevers.

PEPTONE, n. *pĕp'tōn*, a compound resulting from the action of pepsin, with diluted acid, on albuminous substances. PEPTONES, n. plu. bodies into which all albuminous substances, except amyloid, are changed by the action of acid gastric juice (see PROTEIDS: PROTEINE: DIGESTION). PEPTIC, a. *pĕp'tĭk*, relating to or promoting digestion; dietetic. PEPTONIZE, v. to change into peptones.

PEPYS, *pĕp'ĭs* or *pĕps*, SAMUEL: distinguished officer of the English admiralty during the reigns of Charles II. and James II.: 1632–3, Feb. 23—1703, May 26: a son of a London citizen, a tailor. He was well educated, first at St. Paul's School, afterward at Magdalene College, Cambridge. His cousin, Sir Edward Montagu (first Earl of Sandwich), introduced him to public employment. In 1660 he was appointed clerk of the acts of the navy, and 1673 sec. for the affairs of the navy. He was an excellent public servant, acute, diligent, honest, and laborious; but during the fanatical excitement of the Popish Plot he was committed to the Tower (1681), on an unfounded and absurd charge of aiding in the design to dethrone the king and extirpate the Protestant religion. Having been discharged without a trial, Pepys was replaced at his post in the admiralty, which he retained till the abdication of James II. For two years he held the honorable station of pres. of the Royal Soc. Pepys wrote *Memoirs of the Royal Navy*, 1690. He left to Magdalene College his large collection of books, MSS., and prints, including about 2,000 ancient English ballads, forming five folio volumes. This curious collection was begun, he says, by Selden, and continued till 1700, when the form peculiar to the old ballads—namely, the blackletter, with pictures—was laid aside for the simpler modern fashion. Pepy's character was full of contradictions, and his morality in private life was exceedingly easy. He was no statesman, and no great scholar; but he was a faithful public official, and a truthful writer of the gossip of his times. Accordingly, he is now best remembered for his *Diary*, deciphered by the Rev. J.

Smith from the original shorthand MS. in the Pepysian Library, Cambridge, and published first under the editorial care of Lord Braybrooke 1825. It commences 1659,60, Jan. 1, and continues more than nine years, when the diarist was obliged from defective eyesight to abandon his daily task. As a picture of the court and times of Charles II., this *Diary* is invaluable; the events, characters, follies, vices—the brilliant wickedness of that reign—are presented in true and lively colors, and the work altogether is one of the most racy, unique, and amusing books in the language. Without this diary, we should be almost without any due understanding of the history of that period. Bright's edition (1875–80) is in 6 vols. See Wheatley's *P. and the World He Lived In* (1880).

PEQUOTS, *pē'kwŏts*, or PEQUODS, *pē'kwŏds:* tribe of N. Amer. Indians of the Algonquin family; they probably branched off from the Hudson-river Mohicans about the beginning of the 17th c. They were the dominant Indian tribe of Conn., and occupied a tract of about 500 sq. m., from the Niantic river to Wecapaug, R. I. In 1633 they sold to the Dutch the site of a fort on the Connecticut river, and the next year entered into a treaty at Boston and made peace with the Narragansetts, but soon afterward became hostile. Endicott and Gardiner led expeditions against them, and they in turn attacked Wethersfield, killing many settlers. Capt. Mason, with 90 white men and several hundred Mohicans, under their chief, Uncas, surprised the P. forts near Mystic, Conn., 1637. Their wigwams were burned, and many hundred men, women, and children perished. The remnant of the tribe continued the war until they were nearly annihilated in the Fairfield swamps. Their chief, Sassacus, was killed by the Mohawks, to whom he had gone for refuge. Many P. were sold as slaves to the W. Indies; but two bands eventually gathered, 1655, one near New London, the other on the Pawçatuck, for whom laws were made. They were located at Ledyard and n. Stonington 1667. In King Philip's War, and in operations against the French, they were allies of the settlers. The two bands numbered 44 in 1848. Some of them removed to N. Y. with the Brotherton Indians, and emigrated to Green Bay, Wis., where a few still remain.

PER, *pėr* [L.]: a prefix signifying through; thoroughly; by; for. PER becomes PEL before *l*, as in *pel*lucid. PER standing alone signifies *by*. PER ANNUM [L. *annus*, a year]: yearly, or by the year. PER BEARER, by the bearer. PER CENT, *sĕnt* [L. *centum*, a hundred]: for every hundred. PERCENTAGE, *-sĕn'tāj*, rate by the hundred. PER DIEM, *dī'ĕm* [L. *dies* or *dĭĕm*, a day]: by the day. PER HEAD, for each one of a certain number (see PER CAPITA, SUCCESSION, below). PER MAN, each man. PER SALTUM, *săl'tŭm* [L. *saltus*, a leap]: at a leap. PER SE, *sē* [L. *se*, himself]: by himself or itself.

PE'RA: a suburb of CONSTANTINOPLE (q.v.).

PERADVENTURE, ad. *pĕr'ăd-vĕn'tūr* [L. *per*, through, and Eng. *adventure:* F. *par aventure—par*, by, for L. *per*, through, and *aventure*, chance]: by chance; perhaps.

PERAK, *pā-râk':* one of the largest Malay states in the peninsula of Malacca, extending about 90 m. along the Strait of Malacca, and about 45 m. inland; about 18,000 sq. m. The soil is fertile, and mostly covered with luxuriant vegetation. The mineral wealth is very great, and comprises abundance of tin, some gold and plumbago, and poor coal. Within recent years the expectation has been raised that P. would become the greatest tin-producing country in the world. Elephants, tigers, leopards, bears, and boars, and occasionally a rhinoceros, are found. P. is thinly inhabited by various races, of which the Malays are most numerous. Some of the others are of the same stock as the inhabitants of Sumatra: there are wild hill-tribes in the interior. Cannibalism is still practiced by some of these races. See M'Nair's *P. and the Malays* (1877). P. is governed by a sultan and petty chiefs, who have of late come under British influence, represented by a resident and his assistants. The murder of the British resident 1875 brought P. into evil fame. It is now practically a dependency of the Brit. crown colony of the Straits Settlements (q.v.). The cap. is Kinta; port, Port Weld. The revenue was reported (1889) about $1,500,000. Pop. (1891) 212,997; (1901) 329,665.

PERAMBULATE, v. *pėr-ăm'bū-lāt* [L. *peram'bula'tus*, walked or rambled through—from *per*, through; *am'bŭlo*, I walk about]: to walk or pass through or over; to survey by passing through. PERAM'BULATING, imp. PERAM'BULATED, pp. PERAM'BULA'TION, n. *-lā'shŭn*, act of passing through or over; a travelling survey or inspection; annual survey of the bounds of a town, village, or parish (see below). PERAM'BULA'TOR, n. *-tėr*, an instrument for measuring distances on roads; a child's carriage which an attendant pushes from behind. PERAM'BULATORY, a. *-lā-tėr-ĭ*, rambling through or over.

PERAMBULA'TION OF PARISHES: ancient custom of Rogation week in England. It was designed to supplicate the Divine blessing on the fruits of the earth; and to preserve in all classes of the community a correct knowledge of, and due respect for, the bounds of parochial and individual property. It appears to have been derived from a still older custom among the ancient Romans, called Terminalia and Ambarvalia, festivals in honor of the god Terminus and the goddess Ceres. On its becoming a Christian custom, the heathen rites and ceremonies were discarded, and those of Christianity substituted. It was appointed to be observed on one of the Rogation (q.v.) days, the three days next before Ascension Day. Before the Reformation, parochial perambulations were conducted with great ceremony. The lord of the manor, with a large banner, priests in

surplices and with crosses, and other persons with hand-bells, banners, and staves, followed by most of the parishioners, walked in procession round the parish, stopping at crosses, forming crosses on the ground, 'saying or singing gospels to the corn,' and allowing 'drinkings and good cheer' (Grindal's *Remains*, pp. 141, 241, and *Note;* Whitgift's Works, III. 266,7; Tindal's Works, III. 62, 234, Parker Society's edition); which proceedings were remarkable, as the Rogation days were appointed fasts. From the different practices observed on the occasion, the custom received the various names of *processioning, rogationing, perambulating,* and *ganging the boundaries;* and the week in which it was observed was called *Rogation week; Cross week,* because crosses were borne in the processions; and *Grass week,* because, the Rogation days being fasts, vegetables formed the chief diet.

At the Reformation, the ceremonies and practices deemed objectionable were abolished, and only 'the useful and harmless part of the custom retained.' Yet its observance was considered so desirable that a homily was prepared for the occasion; and injunctions were issued requiring that, for 'the perambulation of the circuits of the parishes, the people should once in the year, at the time accustomed, with the rector, vicar, or curate, and the substantial men of the parish, walk about the parishes, as they were accustomed, and, at their return to the church, make their common prayer. And the curate, in their said common perambulations, was at certain convenient places to admonish the people to give thanks to God (while beholding of his benefits), and for the increase and abundance of his fruits upon the face of the earth, with the saying of the 103d Psalm. At which time also the said minister was required to inculcate these or such like sentences, Cursed be he which translateth the bounds and doles of his neighbor; or such other order of prayers as should be lawfully appointed.' (Burn's *Ecclesiastical Law*, III. 61.)

To this day, questions of disputed boundary between parishes are invariably settled by the evidence afforded by these perambulations; for in such questions, immemorial custom is conclusive. And so far are they recognized in law, that the parishioners on such occasions are entitled to trespass on lands, and even to enter private houses if these stand on the boundary-line. In Scotland, where the parochial principle has never been developed as in England (see PARISH), there seem few traces of a similar practice. But, as between neighboring landowners, a breve of perambulation is the technical remedy for setting right a dispute as to boundaries or marches; and perambulating or 'riding' the bounds of boroughs is a common practice.

The necessity or determination to perambulate along the old track often occasioned curious incidents. If a canal had been cut through the boundary of a parish, it was deemed necessary that some of the parishioners

should pass through the water. Where a river formed part of the boundary-line, the procession either passed along it in boats, or some of the party stripped and swam along it, or boys were thrown into it at customary places. If a house had been erected on the boundary-line, the procession claimed the right to pass through it. A house in Buckinghamshire, still standing, has an oven passing over the boundary-line. It was customary in the perambulations to put a boy into this recess, to preserve the integrity of the boundary-line. At various parts of the parish boundaries, two or three of the village boys were 'bumped'—that is, a certain part of the person was swung against a stone wall, a tree, a post, or any other hard object which happened to be near the parish boundary. This, it will scarcely be doubted, was an effectual method of recording the boundaries in the memory of these *battering-rams*, and of those who witnessed this curious mode of registration.

The custom of perambulating parishes continued in parts of the kingdom to a late period, but the religious portion of it was generally, if not universally, omitted. The custom has, however, of late years been revived in its integrity in many parishes.

PERAME'LES: see BANDICOOT.

PERBENDS, n. plu. *pėr'bĕndz*, or PERBANDS, n. plu. *-bănd*z [F. *parpaing*]: stones carried through the whole thickness of a wall: see PERPENDER.

PERCALE, n. *pėr'kāl* [F.]: cotton goods, printed or plain, and with a linen finish.

PERCALINE, n. *pėr-ka-lēn'* [F.]: fine French printed cotton goods.

PER CAPITA, *pėr kăp'ĭ-tâ*, SUCCESSION: coming of persons into the estate of a deceased person on the condition of share and share alike—i.e., when descendants take as individuals (*capita*), not by right of representation (*per stirpes*). When all the living descendants of an intestate are in the same degree of kinship to him, they take equal shares of his estate: but if some are in one degree (e.g., children) and others in another degree (e.g., grandchildren), the former take *per capita;* the latter take *per stirpes*, receiving as their shares so much of the estate as would have come to their representative or representatives in the nearer degree of kinship.

PERCEIVE, v. *pėr-sēv'* [OF. *perceveir;* F. *percevoir,* to perceive—from L. *perciperc,* to observe—from *per,* thoroughly; *capĭo,* I take]: to have the knowledge of external objects through the medium of the senses; to observe; to know; to understand; to discover. PERCEIV'ING, imp. PERCEIVED', pp. *-sēvd'*. PERCEIV'ER, n. *-ėr,* one who perceives. PERCEIV'ABLE, a. *-ă-bl,* that may be felt, seen, heard, or tasted; discernible by the mind. PERCEIV'ABLY, ad. *-blĭ.* PERCEPTIBLE, a. *pėr-sĕp'tĭ-bl* [L. *perceptus,* observed, perceived: F. *perceptible*]: that may impress the senses; capable of being perceived. PERCEP'TIBLY, ad. *-tĭ-blĭ.* PERCEP'TIBLENESS, n. *-bl-nĕs,* or PERCEP'TIBIL'ITY, n. *-bĭl'ĭ-tĭ,* state or quality of being perceptible. PERCEP'TION, n. *-shŭn* [F.—L.]: the power, act, or state of receiving a knowledge of external things by impressions on the senses; idea; notion; conception (see below). PERCEP'TIVE, a. *-tĭv,* having the power of perceiving. PERCEPTIVITY, n. *pėr'sĕp-tĭv'ĭ-tĭ,* the power of perception or thinking.—SYN. of 'perceive': to discern; distinguish; see; feel; apprehend; note; remark; behold.

PERCEPTION, in Psychology: the becoming aware of things and events, and of their qualities and relations, through the medium of the senses. A percept is the awareness of some thing or fact; that which is perceived is called the object of the percept. Perception is readily distinguished from memory and imagination, in that the remembered or imagined object is not present to the senses and does not seem present. In hallucinations (q.v.), however, an object which is absent seems to be present, so that the hallucination does not differ introspectively from a percept. In illusions (q.v.) though an object is present, it is wrongly perceived; introspectively, again, an illusion differs in no respect from a true percept.

The distinction between perception and sensation is hard to draw. Theoretically, the sensation is that in an experience which is due to the sense stimulus, while perception includes the meaning associated with this sensation and called up by it. Sensation is correlated with the activity of the 'sensory centers' of the brain, and is lost only when either those centers or the sense organs or nerves are destroyed. Perception requires in addition the activity of associated centers, and injury to these may destroy the power of perceiving certain classes of objects, without abolishing the sensations (object-blindness, word-deafness, etc.). Sensations respond to their stimuli according to inborn connections, while perceptions are acquired. The same stimulus should always give the same sensation, but it may give different precepts according to the past experience of the individual, and according to the momentary direction of his thoughts. Thus, in the case of puzzle pictures, as long as one looks steadily at the picture, the sensation is conceived as unchanging, or as changing

only with fatigue of the eye; but the percept changes altogether at the instant when the hidden face or animal is detected. Though the distinction between sensation and perception is thus theoretically easy, it is introspectively impossible to analyze a percept into its sensory and associated parts; nor is it usually possible to check the tendency to perceive, and drink in the mere sensory presentation. A sensation is used as the sign of an object or fact, and we pass so promptly from the sense impression to the fact that we are much more keenly conscious of the fact than of the sensory sign. A certain luminous blue above us means a clear sky, a certain gruff and repeated noise means a dog barking, a certain soft and slippery feeling at our feet means mud; these objects seem as if sensed rather than suggested, and yet it is clear that without past association the sensations would not suggest just these objects. The simple sensory qualities, as warmth and cold, light and darkness, colors, sounds and odors, may, with some justification, be thought of as sensations; yet any one of them is perceived, when it is itself the object of observation, when it is singled out and attended to. There are thus two essentials of perception,—selection or discrimination, and association,—both of which are bound up so closely with sensation that they can not be introspectively separated. Where selection and association are specially preponderant over sensation in producing a percept, the name 'apperception' is sometimes applied.

The difficulty of isolating the sensory components of a percept is strikingly brought out in case of the perception of space and of time, for here it is impossible, by direct observation, to discover on what sense data the perceptions rest. A sense for empty space or empty time is hardly conceivable. In the case of time, the perception of short durations, of say less than a minute, has been held by some authorities to rest on the feelings of repeated muscular actions, such as breathing; but other factors, such as the intensity of sounds whose time relations are to be perceived, have been shown to have great influence on the perception; the perception of time is a very intricate subject, and is closely bound up with the perception of rhythm.

The problem of the perception of space is one of the most prominent in the history of Psychology. One of the chief discussions has been that between the 'empiricists' and the 'nativists.' The latter, among whom Hering, Stumpf and James are prominent, hold that the spatial quality is natively inherent in all sensations, or at least in those of sight, touch and bodily movement, and that, being something unique, it cannot have been generated out of a combination of non-spatial elements. The empiristic view started with Berkeley, who held that sight possesses in itself no spatial quality, and that the appearance of space in vision is due to its

suggesting the experiences of touch. In the hands of the British associationists, and in the hands of Helmholtz, Wundt and other Germans, this doctrine has been extended to deny the spatial quality to any sensation taken by itself, and to derive it from the association or combination of diverse sensations, usually of sight or touch with sensations of movement. The movements of the eyes have been assigned special importance in the genesis of the visual consciousness of space. General agreement has not yet been reached.

More in detail, great attention has been given to the determination of the sensory data on which is based the visual perception of the third dimension, of the distance of objects from the eye. Binocular vision contributes much to the accurate perception of distance and solidity. The eyes, from their different positions, receive slightly different views of any solid object that is not too far away; without being conscious of these two conflicting views, we nevertheless utilize their difference in perceiving the distance and relief of the object. The strong appearance of relief afforded by the stereoscope arises from this fact. Other factors in the perception of distance are the movements in the field of view caused by movements of the head and body, the space in the field of view occupied by familiar objects—the more distant the object, the smaller space does it occupy—the presence of intervening objects, shadows and haze, color and brightness. The convergence and accommodation of the eyes also differ with the distance of the object fixated, and it is probable that sensations from these sources contribute somewhat to the perception of the distance of near objects. The perception of space is subject to many curious illusions.

PERCEPTION OF TIME: direct and immediate awareness of duration. The cognition of past, future, or long periods of time is a matter of memory, imagination, inference, etc. Our perception of time is limited to awareness of the present wave in the stream of consciousness. This perceived present is usually called the 'specious' present. It seldom exceeds ten seconds. The limits may be determined, e.g., by observing how many beats of the pulse, a metronome, or a clock can be grasped in one span without counting. Perception of time is one aspect of the perception of change. It may be contrasted with space perception which is perception of the permanent. Time is perceived in terms of duration of processes. When there is no outer event, time-consciousness seizes upon the bodily rhythms of which we are otherwise ordinarily not aware. There is no 'empty' time. We never perceive a point in time; it is always extent, no matter how short. Beyond three seconds, there is a tendency to build up time estimates by counting events or processes of some sort. Rhythm is one of the greatest aids although it is in itself, in

this sensory form, a product of time-perception. To the time-perceiving individual, there is rhythm everywhere, short and long, from the beat of his own pulse to the long stellar periods. We can perceive duration through any or all of the senses, but hearing is the dominant time-sense. If two instantaneous events are presented simultaneously to different senses, they are perceived in sequence, the order depending upon the image type of the observer. There are numerous illusions which occur systematically and may be expressed in laws of time-perception. See RHYTHM.

PERCEVAL, *pėr'sēval*, The Right Hon. SPENCER: English prime minister: 1762, Nov. 1—1812, May 11; b. London; second son of John, Earl of Egmont. He was educated at Harrow, and at Trinity College, Cambridge; was called to the bar at Lincoln's Inn, and soon obtained repute as a diligent lawyer. Obtaining a seat in parliament for Northampton 1796, he was soon conspicuous for his extreme horror of popery, and his violent advocacy of the 'Protestant interest.' In the Addington administration, he was made solicitor-general, 1801, and attorney-general 1802. In the Portland administration, 1807, he was made chancellor of the exchequer; and on the death of the Duke of Portland, 1809, Perceval became premier, uniting to his former office that of first lord of the treasury; which offices he retained till his death. Perceval was killed by a pistol-shot from a man named Bellingham, a Liverpool broker, trading with Russia, who, having sustained some losses and injuries, which he had vainly applied to the govt. to redress, determined to avenge himself by taking the life of the premier. Perceval was ready in debate, a placid and not ungraceful speaker, and led the house of commons with much tact; but he was superficial and intolerant. Sydney Smith, in his *Letters of Peter Plymley*, has given Perceval a kind of fame by his sarcasm. It was the fashion, when Perceval's public policy was attacked, to laud his domestic virtues; and as to this, 'Peter' said that, if he had to choose between public and private virtues, he should prefer that Mr. Perceval 'owed for the veal of the preceding year, whipped his boys, and saved his country.'

PERCH, n. *pėrch* [F. *perche*, a pole, a perch—from L. *pertĭcă*, a pole or long staff: Sp. *percha*, a barber's sign-post]: a pole; a long staff; anything on which fowls roost or light: a measure of length of 5½ yds., or 16½ ft.—as a measure of area, the 40th part of a rood: v. to place or set upon, as a bird on a perch; to light or settle on; to sit or roost, as a bird. PERCH'ING, imp. PERCHED, pp. *pėrcht*. PERCHER, n. *pėrch'ėr*, one of an order of birds, the *perchers*, that perch or light on trees. PERCHED BLOCKS, in *geol.*, detached blocks of rocks which have been left by glaciers on the brows or ridges of hills or mountains.

PERCH, n. *pėrch* [F. *perche*—from L. *perca;* Gr. *perkē*, a perch—from Gr. *perknos*, dark-colored], (*Perca*): genus of acanthopterous fishes, of family *Percidæ*, to which it gives its name, and which includes many genera and a very great number of species both of marine and of fresh water fishes. The *Percidæ*, or P. family, have the body somewhat oblong and more or less compressed; the scales rather large; the bones of the gill-covers toothed or otherwise armed; the mouth without barbels; the *vomer* toothed, generally the palate also; there are sometimes two dorsals, sometimes only one. To this family belong not only the true perches, all of which are fresh-water fishes, but the Lates (q.v.) of the Nile, the Bass (q.v.) or Sea P., and their congeners, the Pike-perches (q.v.), the *Serrani*, and many other fishes. The true perches (*Perca*) have two dorsal fins, distinct and separate, the rays of the first spinous and those of the second flexible; the tongue is smooth; and the gill-covers are bony, notched, and sharply serrated. The COMMON P. (*P. fluviatilis*) is an inhabitant of the lakes, ponds, and still rivers of almost all parts of Europe; and the N. Amer. form (often called *P. flavescens*) cannot be positively separated from it as a species. It is of greenish-brown color, passing into golden yellow on the under parts, and marked on the back with six or seven indistinct blackish cross-bands. Its height is about one-third of its length, though there is much variety in its proportions. It often attains a length of 16 or 18 inches, and a weight of 2 or 3 lbs.; but perches have been taken of 8 lbs. weight or more. The P. loves still waters, and is easily reared in ponds; but it is not a desirable inmate of ponds intended for other fish, because it is very voracious, and devours their fry. It is readily caught by almost any kind of bait, and sometimes takes a small artificial fly. It is much esteemed for the table. It lives a long time out of the water if kept moist, and in some countries is thus brought to market, and carried back to the pond if not sold. The female P. deposits her eggs in long strings, united by a viscid matter.—A species (*P. Italica*) found in s. Europe differs from the Common P. in its shorter and deeper form, and lack of black bands.—A minute crustacean, known as the perch-pest, infests the mouth of the perch.

PERCHANCE, ad. *pėr-chăns'* [L. *per*, for F. *par*, by, and Eng. *chance*]: by chance; perhaps.

PERCHE, LE, *lėh pĕrsh:* portion of France, in early times belonging to the province of Maine, and lying s. of Normandy, with Mortagne for cap. In the 16th c. it became part of the kingdom of France. In the modern division of the country, it forms portions of Orne, Eure-et-Loir, and Eure departments.

PERCHLORATE, n. *pėr-klŏr′āt* [L. *per*, through: Gr. *chlōros*, green]: a compound of perchloric acid with a base. PERCHLOR′IC ACID ($HClO_4$), colorless liquid, density 1·782 at 60°, not solidifying at —31°; obtained by distilling potassium perchlorate with sulphuric acid. Its vapor is transparent and colorless; in contact with moist air it produces dense white fumes. Perchloric acid, when cautiously mixed with a small quantity of water, solidifies to a crystalline mass—a compound of perchloric acid with one molecule of water: $HClO_4 + H_2O$. When brought into contact with carbon, ether, or other organic substances, perchloric acid explodes with great violence; hence it is a dangerous substance to handle.

PERCIPIENT, a. *pėr-sĭp′ĭ-ĕnt* [L. *percipĭen′tem*, observing—from *per*, through, and *capĭo*, I take]: having the faculty of perception; perceiving: N. one who perceives or has the faculty of perception.

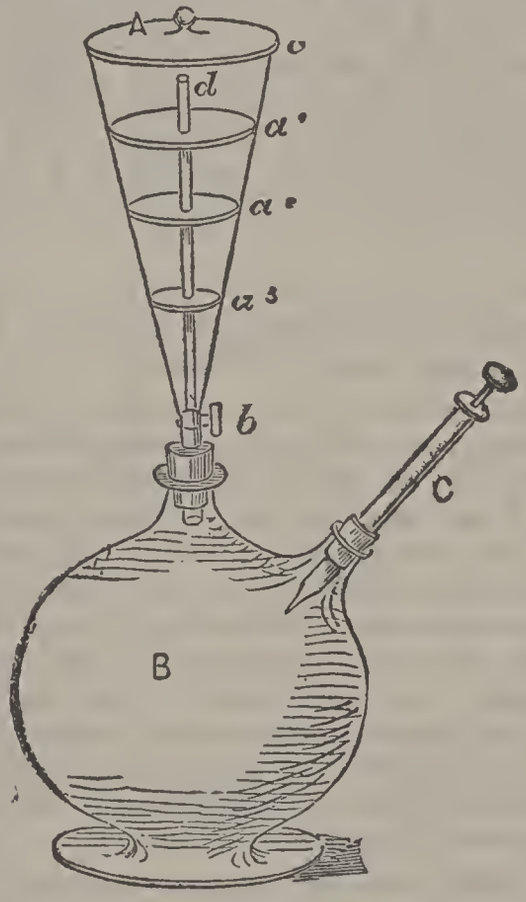
PERCIVAL, *pėr′sĭ-val*, JAMES GATES: geologist and poet: 1795, Sep. 15—1856, May 2; b. Berlin, Conn. In childhood he was remarkably precocious; at the age of 14 wrote a heroic poem; graduated at Yale 1815, at the head of his class; practiced medicine in Charleston, S. C.; became asst. surgeon in U. S. army, and for a time was prof. of chem. at the U. S. Milit. Acad. He settled in New Haven, Conn., 1827; studied geology; with Prof. Shepard, made geological survey of Conn. 1835; began survey of Wisconsin 1853. He could speak 10 languages, and was a musician, poet, botanist, and geologist. In his habits he was a recluse and somewhat eccentric. P. died at Hazel Green, Wis.—He published a vol. of poetry 1820; *Prometheus* and *Clio* (1822); *Poems* in 2 vols. (1826); translated *Malte Brun's Geography*, 3 large 4to vols. (1834); *Dream of a Day* (1843). A complete collection of his works, some of which are tragedies, was issued 1859. His report on the geol. of Conn. (1842) was a work of great learning and labor, and contained a study of trap formations, supporting a theory of fractures of the earth's crust. His *Life and Letters*, ed. by Julius H. Ward, was published 1866.

PERCLOSE, *pėr′klōz* or *-klōs:* railing or other inclosure separating a tomb or chapel from the rest of a church. P., or DEMI-GARTER, in *her.*, is the lower half of the garter with the buckle.

PERCOID, a. *pėr′koyd* [Gr. *perkē*, the perch; *eidos*, resemblance (see PERCH 2)]: resembling the perch; pertaining to the PER′COIDS, or PERCOIDÆ, *pėr-koy′dē*, the perch family.

PERCOLATE, v. *pėr′kō-lāt* [L. *percolātus*, percolated —from *per*, through; *colo*, I strain—from *colum*, a filter]: to strain or filter through; to cause to pass through porous substances, or those not perfectly compact and solid. PER′COLATING, imp. PER′COLATED, pp. PER′COLATOR, n. *-lā-tėr*, that which filters a liquid. PER′COLA′TION, n. *-lā′shŭn*, the act of passing a liquid through a

medium, as through felt or a porous stone; purification by straining; a process much used in pharmacy, and in some other arts, for extracting certain soluble properties of various bodies by filtering a liquid through them. About 50 tinctures and extracts are properly prepared thus. As the fluid soaks in and passes through the material acted on, it displaces and carries with it the soluble parts; hence percolation is sometimes called the *Method of Displacement*. The forms of apparatus for percolation are very numerous, but the principle is the same in all—viz., a vessel with a porous bottom, and in the form of a truncated cone inverted, receives the material first, and over it is poured the water or other fluid which is to extract its virtues. One made by an eminent French pharmacien, M. Bejot, is very effective and complete. A is a long funnel-shaped glass, with a glass



Perçolator.

stop-cock (*b*) in the bottom, which narrows to an inch diameter; this fits into the neck of a large globular vessel B, both being adjusted by grinding. C is a syringe of brass fixed in the glass B as shown, and made air-tight by a caoutchouc washer. a^1, a^2, a^3 are three diaphragms of porous felt, pierced by the tube *d*, which allows air-bubbles to escape from the bottom without disturbing the fluid. The material to be acted on, as wood, bark, root, leaves, etc., is first powdered, and is then laid on the top of the uppermost diaphragm, a^1, so as to half-fill the space between it and the glass-cover *c;* water, or any other required fluid, is then poured in until it is filled.

the stop-cock *b* is opened, and the operator draws the air from the outer vessel by means of the air-pump C; the fluid is thus rapidly drawn through the material, and displaces its soluble parts. a^2 and a^3 arrest the fine solid particles which are carried through the first diaphragm with the liquid, and form sediments which also are acted on by the liquid, which is checked at each division for a time. The fluid, however dark-colored, when it reaches the globular glass is beautifully bright and clear, and the preparations so made are remarkable for good quality and uniformity of strength. Redwood's percolator (invented 1864) has great efficacy. It consists of a tinned copper cylinder, with a smaller cylinder of flannel inside, in which the materials are put. The whole is filled with the fluid menstruum, and as that which is in more immediate contact with the solid materials becomes charged with the soluble matter displaced, it gives rise, as its density is increased, to an endosmotic action through the flannel walls of the inner cylinder, until the whole is equalized, when it is drawn off by the tap, and fresh fluid added until it comes away colorless. The outer cylinder has a tight cover to prevent loss by evaporation.

PERCURRENT, a. *pĕr-kŭr'rĕnt* [L. *per*, through; *currens* or *curren'tem*, running—from *curro*, I run]: running through from top to bottom.

PERCUSS, v. *per-kŭs'* [L. *percussus*, thrust or pierced through—from *per*, through; *quatĕrĕ*, to shake]: to strike forcibly; to strike in order to ascertain the resulting sound. PERCUS'SING, imp. PERCUSSED, pp. *-kŭst'*. PERCUSSION, n. *pĕr-kŭsh'ŭn* [F.—L.]: act of striking one body against another; effect or impression of sound on the ear; impression one body makes on another by striking or falling upon it: act of striking or tapping on the chest, abdomen, etc., that sounds may be produced, by which the conditions of the parts may be ascertained (see below). PERCUS'SIVE, a. *-kŭs'sĭv*, striking against. PERCUSSION-LOCK, gun-lock that acts by percussion. CENTRE OF PERCUSSION (see that title).

PERCUS'SION, in Medicine: method of eliciting sounds by tapping or gently striking the surface of the body; its object being to determine by the nature of the sound the comparative density of the subjacent parts. This means of diagnosis was employed first by Avenbrugger in the middle of the 18th century, and was afterward adopted by Corvisart in investigation of heart-diseases; but its value was not fully appreciated till Laennec made the diseases of the chest his peculiar study.

Percussion is employed in the diagnosis chiefly of diseases of the lungs, heart, and the abdominal organs. It may be *direct* (or, as some writers term it, *immediate*), or it may be *mediate*. In the former case, the part to be examined is struck with the ends of the three

first fingers set close together on the same level, or with a small mallet tipped with India-rubber; while in the latter, now almost universally adopted, a flat body—a *Pleximeter* [Gr. *plexis*, a blow; *metron*, a measure] is placed on the chest, or other part to be examined, and is then struck by the fingers or mallet. The left index or middle finger of the physician, with its flat surface fitted accurately to the part to be examined, serves equally well. The force of the stroke—whether with use of the fingers or the mallet—must vary according as it is desired to elicit the sound from a superficial or a deep-seated part. The surface to be percussed should be exposed, or covered with, at most, only one layer of clothing; and the blow should fall perpendicularly on the pleximeter. When percussion is made over a considerable cavity filled with air—e.g., the stomach or intestines—a hollow, drum-like, or (as it is usually termed by medical writers) *tympanitic* sound is produced. When any part of the surface of the chest is struck below which there is considerable depth of healthy lung-tissue consisting of small cells filled with air, a clear sound is evolved, less loud and hollow than the tympanitic sound, and termed the *pulmonary percussion-note*, depending partly on the vibrations of air in the lung-cells, and partly on the vibrations of the walls of the chest. When the subjacent substance is solid (as the heart, liver, or spleen) or fluid (e.g., when there is effusion into a closed sac), the sound is *dull* in proportion to the density and want of elasticity of the part struck. The first requisite to make percussion useful in diagnosis of disease is accurate knowledge of the sounds elicited from the different parts in their normal condition. When, e.g., the healthy plumonary percussion-note is known, increased resonance of the walls of the chest will indicate dilatation of the air-cells (*or* Pulmonary Empysema), while various degrees of dulness will indicate such morbid changes as the effusion of fluid into the pleura (Hydrothorax), or inflammatory solidification of the lung-tissue (the Hepatization in Pneumonia), or tuberculous deposit. For the use of Percussion in diagnosis see PERICARDITIS; PLEURITIS; PNEUMONIA; etc.

PERCUS'SION CAPS: small copper cylinders, closed at one end, for conveniently holding the detonating powder exploded by a stroke from the trigger in percussion-arms. Caps were not used with the earliest percussion-arms, which the Rev. Mr. Forsyth of Aberdeenshire, Scotland, patented 1807; but they came into general use 1820-30, and were adopted for the Brit. army by 1840. With adoption of breech-loading arms, the use of *separate* caps has been discontinued; the cap now forms a part of the cartridge, and at one operation is placed with it in the open breech of the gun. The manufacture is extremely simple: A sheet of thin copper is

stamped into pieces of appropriate shape, which are bent into the form of caps by stamping-apparatus closing round a mandril, the whole being done in one machine by two operations. The caps are then placed in a tray, mouths upward; and the inside of each is touched with strongly adhesive varnish. Over this is dusted the detonating powder, all the particles which fail to adhere being blown, dusted, or shaken out. A stamper again is forced into the cap, to fix and compress the powder, and the operation is completed. For muskets, the caps are charged with equal parts of fulminating mercury and chlorate of potash; for cannon, with a mixture of two parts of chlorate of potash, two parts of native sulphuret of antimony, and one of powdered glass; the last ingredient taking no part in the chemical action, and added merely to increase the friction. For the manner of using a P. C., see LOCK.

PERCY, *pėr´sĭ*, FAMILY OF: noble Norman family that accompanied William the Conqueror to England; and whose head, William de P., obtained from his sovereign 30 Knights' Fees in n. England. The representation of the house devolved (in the time of Henry I.) on Agnes, daughter of the 3d baron, who married Josceline of Louvain, brother-in-law of the king, only on condition that he adopted either the surname or the arms of P.; he chose to retain his paternal arms and to assume the P. name. His youngest son, Richard de P., was one of the chief barons who extorted Magna Charta from King John; and the 9th feudal lord, Henry de P. (in the time of Edward I.), showed a similar spirit, maintaining against the pope the spiritual independence of the English crown. This nobleman's great-grandson, a distinguished military commander under Edward III and acting as marshal of England at the coronation of Richard II., was created Earl of Northumberland. He subsequently, however, took up arms against Richard, and placed the crown on the head of Henry of Lancaster, who became Henry IV. Again dissatisfied with the government, he joined in rebellion with his son Hotspur (see Shakespeare's *Henry the Fourth*), for the purpose of transferring the crown to Mortimer, Earl of March. The earl, with the other leaders of this rebellion, fell at Bramham Moor (1407–8); and his titles became forfeited. These, however, were revived in favor of his grandson, who became lord high constable of England, and who was killed at the battle of St. Albans. This earl's son and successor (the third earl) met a like fate on Towton field, fighting in the van of the Lancastrian army. The 4th earl (who obtained a reversal of his father's attainder) was murdered by the populace in Northumberland, when ordered by the avarice of Henry VII. to enforce a subsidy. The executions of the 6th and 7th earls by Edward VI. and Elizabeth are part of the history of England. The 8th earl was committed to the Tower, on a charge of being concerned in a plot in favor

of Mary, Queen of Scots, and died a violent death in prison. The 10th earl fought in the civil wars against Charles I.; though he took no part with the regicides, and eventually joined in the general effort to bring the Restoration. In 1670 the male line became extinct, 500 years after the marriage of Agnes de P. and Josceline of Louvain. The 11th earl left a daughter, an only child, who succeeded to the ancient barony of P., and marrying Charles, Duke of Somerset, became mother of Algernon, Duke of Somerset, who was created Earl of Northumberland, with remainder to his son-in-law, Sir Hugh Smithson, of Stanwick, county of York. Sir Hugh, succeeding to the earldom, assumed the name Percy; and obtained 1766 his advancement to the dukedom of Northumberland, to which title succeeded (1867) Algernon-George P., b. 1810. In the whole range of British history, no other family has been so continuously distin guished as that of P., in art, literature, and arms.

PER'CY, THOMAS, D.D.: poetical collector, antiquary, and scholar: 1729, Apr. 13—1811, Sep. 30; b. Bridgenorth, Shropshire, England. He was educated at Christ-Church, Oxford; and having entered the priesthood, rose to be bp. of Dromore, Ireland, 1782. This amiable and accomplished prelate, friend of Johnson, Goldsmith, and other distinguished contemporaries, published translations from the Icelandic, a new version of the *Song of Solomon*, the *Northumberland Household Book*, a translation of Mallet's *Northern Antiquities*, etc. His most popular and valuable contribution to literature was *Reliques of Ancient French Poetry* (1765), consisting of old heroic ballads and songs, with some modern imitations, in which the editor himself displayed the taste and feeling of a poet. P. lived to see four editions of it, and to receive the warm commendations of all poetical readers and critics. The *Reliques* were obtained chiefly from an old folio MS. that had fallen into P.'s hands, with the addition of pieces from the Pepys collection at Cambridge, the Ashmole Library at Oxford, the British Museum, and the works of the earlier English poets. Certain liberties were taken with some of the ballads—softening touches, repairs, and renovations—for which the editor was severely censured by Ritson and other antiquaries; but this point was generally deemed of only minor importance; and the collection was accepted with delight as of great value to English literature, recalling the public taste to the rude energy, picturesqueness, and passion of the old chivalrous minstrels and Elizabethan songsters. It captivated the youthful imagination of Walter Scott, and was the inspirer and model of his *Minstrelsy of the Scottish Border*. The memory of P. has been further perpetuated by a club book assoc., called the PERCY SOCIETY.

PERDICCAS, *pėr-dĭk′as:* Macedonian general under Alexander the Great, after whose death, B.C. 323, he was regent of the empire till his own death, B.C. 321; son of Orontes. He led a portion of the troops in many of the great battles in which Alexander secured his conquests. When on his death-bed, Alexander gave P. his signet-ring, which was regarded as an appointment as his successor. Consequently P. endeavored to exercise royal authority, and for a time succeeded in controlling the govt. and the army. A party led by Antigonus, Antipater, and Ptolemy conspired against him, and while on an expedition against Ptolemy, B.C. 321, he was assassinated by a party of his own soldiers.

PERDIDO, *pĕr-dē′do:* bay and river of Ala. The bay, 20 m. long, 6 to 10 m. wide, opens by a narrow channel into the Gulf of Mexico, 18 m. w. of the entrance to Pensacola Bay. The river rises in s.w. Ala.; and bay and river form the boundary between Ala. and Florida.

PERDIE, or PERDY, ad. *pĕr-dē′* [OF. *pardi*, a common vulgar oath—from F. *par*, by; *Dieu*, God]: in *OE.*, by God; certainly; verily; in truth.

PERDITION, n. *pėr-dĭsh′ŭn* [F. *perdition*—from mid. L. *perditĭōnem*, perdition—from L. *perdĭtus*, ruined, undone]: state of being utterly lost or ruined; misery in a future state.

PERDU, a., or PERDUE, a. *pėr-dū′* [F. *perdu*, lost, undone—from *perdre*, to lose]: forlorn; lost, as one employed on desperate enterprises; accustomed to desperate purposes: N. one lying in ambush: AD. close; in ambush; in a post of danger. LYING PERDU, lying in concealment or ambush.

PERDURABLE, a. *pėr′dū-ră-bl* [OF. *perdurable*, firm, lasting—from L. *per*, through; *durāre*, to last]: in *OE.*, long-continued; lasting; everlasting. PERDURABLY, ad. *pėr′dū-ră-blĭ*, lastingly; enduringly.

PEREA, or PERÆA, *pē-rē′a:* lower portion of e. Palestine; well-watered and fertile region belonging anciently to the tribes of Reuben and Gad. Its boundaries, according to Josephus, were Pella on the n., Philadelphia on the e., and Herod's castle Machærus on the s. The ministries of John Baptist and the Lord Jesus were partly in this district.

PERE DUCHESNÉ: see HÉBERT, JACQUES RENE.

PEREGRINATE, v. *pĕr′ĕ-grĭn-āt* [L. *pĕrĕgrinātus*, having roamed or wandered about—from *perĕgrīnus*, foreign: It. *peregrinare;* OF. *pérégriner*, to travel through foreign parts]: to wander from place to place, or from one country to another. PER′EGRINATING, imp. PER′EGRINATED, pp. *-ā-tĕd.* PER′EGRINATOR, n. *-ā-tėr*, one who travels to foreign countries. PER′EGRINA′TION, n. *-ā′shŭn* [F.—L.]: a wandering in foreign countries or living abroad; a wandering.

PEREGRINE FALCON, *pĕr'ĕ-grĭn faw'kn* [see PEREGRINATE], (*Falco peregrinus*): species of Falcon (q.v.) found in almost all parts of the world. The female is larger than the male, being about 18 in. long from tip of bill to tip of tail, while the male is only about 15 inches. The female is the *Falcon* of falconers, and the male the *Tercel*. The plumage of the two sexes is very similar. The back, wings, and tail are bluish-slate or ash-gray, the feathers barred with a darker tint; the crown of the head, back of the neck, and a spot below the eye, nearly black; the front of the neck is white, with dark longitudinal lines; the breast, belly, and plumage of the legs, whitish, with dark-brown transverse bars. The wings are very long, reaching almost to the tip of the tail; and the bird is remarkable for power of flight, being capable of maintaining for a considerable time a rate of more than 100 m. an hour, so that it is often seen far from any of its haunts or breeding-places; whence the name Peregrine, from the Latin *peregrinus*, a wanderer. Its swoop, when rushing on its quarry, is wonderful for rapidity and force. The P. F. can easily carry through the air a bird or quadruped fully its own weight. Its ordinary prey consists of grouse, woodcocks, rabbits, etc. The woodcock in vain seeks to escape from it by threading its way among branches of trees and brushwood; the falcon follows, and exhibits at least an equal power of moving with great rapidity in the thicket without getting entangled or stayed. Sometimes the quarry soars into the air, and seeks safety by trying to keep above the falcon, till both are lost to ordinary sight; but the falcon generally gets uppermost, and 'strikes' it at last. It has thus been known to cut a snipe in two, and at one swoop to strike off the head of a grouse or pigeon. Owing to the quantity of game the P. F. will capture, it is ruthlessly trapped or otherwise destroyed, so that this beautiful bird is in danger, like others of its family, of being exterminated. The P. F. is a bird as remarkable for boldness as for power of flight. It has sometimes been seen to pounce on game shot by a sportsman before it could fall to the ground; and an instance has occurred of a P. F. dashing through the glass of an aviary in a town, and carrying off a bird. It makes its nest on ledges of high rocks, either on the sea-coast or in inland precipices and ravines, and lays two to four eggs. Numerous localities have long been noted as breeding-places of the P. F.; and some of them in Britain are regularly visited for the young birds, which are still trained in certain places for the sport of falconry. The bird caught when adult, though then more difficult to train, is believed to possess superior qualities. The P. F. is more docile and becomes more gentle than the Gyr Falcon. The young female of the P. F. has been by mistake described by Pennant and others under the name of the Lanner (q.v.), a species not found in Britain.—See FALCONRY.

PEREIRA, *pē-rē′ra* or *pā-rā′ra*, JONATHAN: pharmacologist: 1804, May 22—1853, Jan. 20; b. in the parish of Shoreditch, London. He studied medicine; and 1823 was appointed resident medical officer of the gen. dispensary in Aldersgate street; afterward lecturer on chemistry. In 1824 he published a translation of the *London Pharmacopœia;* followed by *A Manual for the Use of Students; A General Table of Atomic Numbers, with an Introduction to the Atomic Theory;* and other text-books. In 1832 he resigned the office of lecturer for that of prof. of materia medica in the New Medical School in Aldersgate street, and succeeded Dr. Gordon as lecturer on chemistry at the London Hospital. His great work, *Elements of Materia Medica*, appeared as a separate work 1839–40, and at once established his reputation. The treatise is remarkable for research, variety of scientific, commercial, and practical information, and scrupulous exactness. In 1841 he procured the license to practice in London from the College of Physicians: 1845 he was elected a fellow of that body; and on the establishment of the London Univ., he was appointed examiner in materia medica and pharmacy. Among his contributions to science, his excellent treatises on *Diet* and on *Polarized Light* (1843) are best known. His death was the result of a fall.

PÉREIRE, *pā-rār′*, ÉMILE and ISAAC: brothers, French financiers: Émile 1800, Dec. 3—1875, Jan.; Isaac 1806, March 25—1888, July 12; both b. in Bordeaux. They were Israelites; their grandfather, Jacob Rodriguez P., b. in Spain, was founder of the first deaf-mute institution in France. Émile came to Paris 1822 (Isaac 1823); became a stock-broker, soon impressing the leading financiers by his intelligence and the boldness of his ideas, which he had imbibed chiefly from the school of St. Simon. After the revolution of 1830, he separated himself from the St. Simonians and their organ, the *Globe*, and co-operated with the *National*, republican. At this time, he conceived the plan of a bank to protect commerce against commercial crises; and, with his brother, obtained capital from the Rothschilds and others, built the St. Germain railway, and the Northern, and the Southern to Lyons, with lateral canal. Émile is represented as the head, and Isaac the arm, in all their enterprises. They founded the *Crédit Mobilier* (q.v.) 1852, a stock-company for general banking and construction, absorbing or supplanting legitimate corporations, and reaping their profits, with 60 million francs capital in 500-francs shares; its dividends ranged from 5 to 41 per cent., averaging 17, until the shares tumbled from the quotation 1,982 francs in 1856 to 140 francs in 1867. But it gave an immense impetus to improvements as well as to feverish speculation during the second empire, though at the expense of people of small fortunes; it transformed Paris, and even furnished means for the Crimean and Italian wars. A *crédit immobilier*, known as the *Compagnie Rue de Rivoli* (*immobilier*, real estate),

which built the Hotel du Louvre, gave the last blow to the *Crédit Mobilier*. Before and after Emile's death, the principal actors in the schemes were compelled by the courts to disgorge largely. Emile was a connoisseur of art, and led in collecting for exhibition the works of Delaroche. Isaac published some *brochures*—e.g., *Bank of France and the Origin of Credit in France* (1864); *Principles of the Constitution of the Bank, and Origin of Credit* (1865); *Reform of Imposts* (1877); *The Religious Question* (1879); *The Conversion of the Sinking Fund* (1879); *The Question of the Railways* (1879). He instituted, 1880, a competitive prize of 100,000 francs, to be divided among successful writers on four subjects: the extinction of pauperism; a better system of public instruction, with reference to obtaining degrees; the organization of credit, for better development of labor; and reform of taxes. Dumas presided at the examination of 600 memoirs sent in; and M. Hippeau alone obtained a first prize. They were the founders of a maritime company in 1855 which subsequently became the Compagnie générale transatlantique, and did much to build up trade between France and the United States, Mexico, the West Indies and South America.

PEREKOP, *pā-rā-kŏp'*, ISTHMUS OF: neck of land in s. Russia, govt. of Taurida; 18 m. long, 16 m. broad at its s., and 5 m. broad at its n. extremity; connecting the peninsula of the Crimea with the mainland of European Russia. It is an arid waste of mere sand, or sand and clay. There are numerous salt-lakes, and salt has been extensively made. In the n. of the isthmus, and forming the key to the Crimea, is the small town of Perekop, which has little commercial importance. Pop. of town 4,993.

PERE-LA-CHAISE. See LACHAISE.

PEREMTORY, a. *pĕr'ĕmp-tėr-ĭ* [F. *péremptoire*, decisive—from L. *peremptōrĭus*, destructive, deadly; *peremptus*, extinguished, destroyed]: in a manner to preclude debate or remonstrance; positive; final; absolute. PER'EMPTORILY, ad. *-tėr-ĭ-lĭ*. PER'EMPTORINESS, n. *-ĭ-nĕs*, the quality of being peremptory; absolute decision.—SYN. of 'peremptory': express; decisive; dogmatical; arbitrary; authoritative.

PEREMPTORY CHALLENGE, in Law: a privilege permitted in criminal cases when the prisoner's counsel is granted the right to make a specified number of challenges of jurors without giving his cause.

PER'EMPTORY DEFENSES, in Law: defenses to an action or suit, which amount to an entire negative of the right of action, as distinguished from a preliminary or temporary defense.

PERENCHYMA, n. *pĕr-ĕng'kĭ-mă* [Gr. *pēra*, a pouch; *eng'chuma*, what is poured in, an infusion; *cheuma*, a stream—from *cheō*, I pour]: in *bot.*, cellular tissue containing starchy matter.

PERENNIAL, n. *pĕr-ĕn′nĭ-ăl* [L. *peren′nis*, everlasting —from *per*, through; *annus*, a year: It. *perenne*]: in *botany*, a plant whose leaves generally perish annually, but whose root and stem survive more than two years: the term is applied in distinction from Annual (q.v.) and Biennial (q.v.). Some plants, however, which are annual in cold climates, are perennial in warmer regions. The term is in general applied only to herbaceous plants, and indicates a property only of their roots, the stems of most of them dying at the end of each summer. Perennial herbaceous plants, like shrubs and trees, are capable of producing flowers and fruit time after time, in which they differ from annual and biennial plants, which are fruitful only once. Those plants capable of being propagated by cloves, offset bulbs, or tubers, all are perennial, e.g., the potato, though the crop is planted in spring and reaped in autumn, like that of corn, while all the corn plants are annuals.—There is great diversity in the duration of life of perennial plants. PERENNIAL, a. lasting through the year; flowering for several years; perpetual; unceasing. PERENN′IALLY, ad. *-lĭ*.—SYN. of 'perennial, a.': continual; unceasing; perpetual; unfailing; constant; ceaseless; permanent; enduring; uninterrupted; lasting; continuing.

PERENNIBRANCHIATA, n. plu. *pĕr-ĕn′nĭ-brăng′kĭ-ā′tă* [L. *peren′nis*, everlasting; Gr. *brang′chĭă*, gills]: those amphibia in which the gills are permanently retained throughout life. PEREN′NIBRAN′CHIATE, a. *-brăng′-kĭ-āt*, having the gills remaining throughout life, as in the case of certain amphibians.

PEREYASLAVL, or PERESLAVL ZALYESSKII ('P. beyond the Forest,' in distinction from an older P. in Poltava): district town in the middle of Great Russia, govt. of Vladimir, 70 m. n.w. of the city of Vladimir; founded 1052 by George, Prince of Sousdal. It possesses numerous churches and religious institutions; but is noteworthy for its factories, of which the most important are cotton-mills and print-works for cotton goods. The factories are increasingly prosperous. The cotton manufactures of P. are exported to the fairs of Nijni-Novgorod and Irbit, and even to China by way of Siberia. The people are employed in the factories and in the productive fishery of Lake Pleshtcheieff. Pop. (1880) 7,200.

PEREZ, *pē′rĕz*, Sp. *pā′rĕth*, ANTONIO: minister of Philip II. of Spain: about 1540–1611; b. Aragon. His father was secretary of state under Charles I. and Philip II., and P. was appointed to this office when only 25 years of age, and acquired the entire confidence of the king. Don Juan d'Austria, having sent his confidant, Juan de Escovedo, to Spain, to solicit aid against the party of Orange, and Escovedo having rendered himself an object of hatred both to the king and to P., the king resolved to put him out of the way by murder, and in-

trusted P. with the accomplishment of this design, which P., to gratify his own revenge, accomplished accordingly, 1578, Mar. 31. The family of Escovedo denounced P. as the murderer, and all his enemies joined against him. The king at first sought to shield him; but 1581, July, he was arrested, and by torture forced to confess. He escaped to Aragon, where he put himself under protection of its laws. After long and severe inquiry into his conduct, he was found guilty of many acts of fraud and corruption, and condemned to death in Madrid; but the *Justicia Major*, or highest court of justice in Saragossa, refused to deliver him up. The king applied for aid 1591, May, to the Inquisition, and the Aragonese court delivered him to its agents, but the people rose in tumult, and liberated him. This happened repeatedly; and at last, 1591, Sep., Philip II. entered Aragon with an army powerful enough to subdue all opposition, abolished the old constitutional privileges of the country, and caused a number of the principal people to be put to death. P., however, made his escape, avoiding the many plots which the king laid for his assassination. He was condemned in Spain as a heretic, but was treated with kindness in Paris and London. He spent the latter years of his life in Paris, and died there in great poverty. P. wrote an account of his misfortunes, *Relaciones*, pub. Paris 1598.

PERFECT, a. *pėr′fĕkt* [L. *perfectus*, rendered perfect, completed—from *per*, thoroughly; *facĭo*, I make: It. *perfetto;* OF. *parfit*, *parfaict;* F. *parfait*, perfect]: complete throughout; not defective or blemished; having all that is requisite to its nature and kind; completely skilled or informed; not liable to err; pure; blameless; in *gram.*, applied to the tense of a verb which signifies an action done in past time, but connected by its continuance or effects with the present; in *OE.*, confident; certain: V. to complete; to finish thoroughly; to raise to a perfect state; to instruct fully; to make wholly skilful. PER′FECTING, imp.: N. the rendering or making perfect; in *printing*, the taking of the impression from the second form of a sheet. PER′FECTED, pp. PER′FECTER, n. *-ėr*, one who makes perfect. PERFECTIBLE, a. *pėr-fĕkt′ĭ-bl* [F.—L.]: capable of being made perfect. PERFECT′IBIL′ITY, n. *-bĭl′ĭ-tĭ*, capacity of becoming or being made perfect (see PERFECTIBILITY OF CHRISTIANS). PERFECTIBILIST, n. *pėr-fĕk-tĭb′ĭl-ĭst*, in *chh. hist.*, generic designation for any Christians holding the doctrine that perfection is attainable in this life. PERFEC′TION, n. *-fĕk′shŭn* [F.—L.]: the state of being perfect; a quality, endowment, or acquirement tending to complete excellence, or to great worth. PERFEC′TIONAL, a. *-ăl*, made complete. PERFEC′TIONIST, n. *-ĭst*, a Christian who believes that some attain to moral perfection on this earth: also, in a widely different sense, a member of a community or assoc. holding an immoral theory which denies the force of moral rules as applicable to 'the perfect' (see PERFECTIONISTS, or BIBLE COM-

MUNISTS). PERFEC'TIONISM, n. *-izm*, doctrine that moral perfection is or can be attained on this earth (see below). PERFECT'IVE, a. *-fĕkt'iv*, conducing to perfection. PERFECT'IVELY, ad. *-lĭ*, in a manner conducive to perfection. PERFECTLY, ad. *pĕr'fĕkt-lĭ*, in a perfect manner; wholly; completely; exactly. PER'FECTNESS, n. *-nĕs*, the state or quality of being perfect; completeness; consummate excellence. PERFECT CADENCE, in *music*, a complete and agreeable close in the harmony. PERFECT CHORD, in *music*, a concord or union of sounds perfect and agreeable to the ear. PERFECT NUMBER, in *arith.*, a number equal to the sum of all its divisions. TO PERFECTION, in the highest degree of excellence. *Note.*—The OE. of PERFECT is *parfit* and *perfite*, but the word was eventually conformed to the L. spelling.—SYN. of 'perfect, a.': finished; entire; complete; consummate; clear; immaculate; faultless; unblemished; full; accomplished.

PERFECTIBIL'ITY OF CHRISTIANS: doctrine held by the Wesleyan Methodists (see METHODISTS) of a *Christian perfection* attainable in this life. It is a perfection not of *justification*, but of *sanctification;* which John Wesley, in a sermon on Christian Perfection, from the text Heb. vi. 1, 'Let us go on to perfection,' earnestly contends for as attainable in this life by believers, by arguments founded chiefly on the commandments and promises of Scripture concerning sanctification; guarding his doctrine, however, by saying that it is neither an *angelic* nor an *Adamic* perfection, and does not exclude ignorance and error of judgment, with consequent wrong affections, such as 'needless fear or ill-grounded hope, unreasonable love, or unreasonable aversion.' He admits, also, that even in this sense it is a rare attainment, but asserts that 'several persons have enjoyed this blessing, without interruption, for many years, several enjoy it at this day, and not a few have enjoyed it unto their death, as they have declared with their latest breath, calmly witnessing that God had saved them from all sin, till their spirit returned to God.' Concerning all which, the general belief of Prot. Christians is, that these persons were merely more self-complacent and less sensible of their own corruptions than is usual, and that the commands and promises concerning sanctification are not inconsistent with the fact of a remaining though gradually decreasing defect of righteousness in Christian disciples, and a need of further sanctification, or with a continued going on unto perfection while this life endures.

That perfection is attainable in this life is held by the Franciscans, Jesuits, and Molinists in the Church of Rome, but denied by the Dominicans and Jansenists; and its supporters generally lay stress on the distinction between mortal and venial sins.

PERFECTIONISM, *pĕr-fĕk'shŭn-ĭzm*, in Christian Theology: doctrine of the attainment of a sinless state in this life. It has been held in various senses, or variously qualified, in different religious communions. By Rom. Catholics it has been taught that in some cases by special grace there may be perfect obedience; in effect, the doctrine is even exceeded by that of overbalancing merits; on the direct question, however, there have been disagreeing parties in the Rom. Cath. Chh. By the Soc. of Friends it is held that one may come 'to be free from actual sinning;' yet 'this perfection still admits of growth' and 'a possibility of sinning.' By John Wesley it was spoken of as from the grace of God, resulting in freedom 'from all unholy tempers, self-will, pride, anger, sinful thoughts;' at its highest, 'it does not exclude ignorance and error and a thousand infirmities;' it is the sanctified heart fulfilling the law by love. By the Oberlin school, as represented by Finney, it all hinges on the nature of sin as only a matter of present will, which must at any moment be either wholly toward obedience or wholly away from it, from the first hour of the Christian life; yet even this view is modified in the followers of this school by the additional idea of a remarkable higher experience in which the promises of God are embraced with a full faith not reached in a common lower experience. By the Oneida communists, as by many antinomians in all ages, the doctrine was travestied and made abominable by the assertion that, in the fulness of the dispensation of Christ, all law is abrogated—hence there can be no sin; the Christian is under Divine guidance and can do as he pleases. It is evident how far is such a view from the speculative theories on perfection which have been held by some of the purest of men.—By all students of the N. Test. it is well known that 'perfect' is used in many senses, such as sincere, or well instructed. Passages that might seem to teach the attainment of a sinless state must be interpreted by the drift of the context and of the whole gospel. By the majority of theologians, sanctification is held to be progressive. In botany, a flower is technically 'perfect' when it has the essential organs, though far from 'complete,' lacking much and even deformed. See PERFECTIBILITY OF CHRISTIANS.

PERFEC'TIONISTS, or BIBLE COMMUNISTS, popularly known as FREE-LOVERS or preachers of Free Love: small American sect, remarkable for their doctrines, abhorrent to the general moral sense, and for the unfaltering way in which they carry them out in practice. The founder of the sect, John Humphrey Noyes (1811, Sep. 11—1886, Apr. 13), was born in Brattleborough, Vt. After practicing law, he studied theology at Andover and Yale, and became a Congregational preacher. He soon adopted new views, and was called to account for them and deprived of his license to preach. The opinions of the apostle Paul, he held, had been completely misconceived by all Christian churches; all our ecclesiastical or

ganizations are accordingly blunders; there had been no visible church of Christ on earth since the apostolic age to his day. He believed that Christ, on his second advent 'in the spirit,' A.D. 70, abolished the old Law, and closed the reign of sin which began with Adam; and that he has thenceforth set up his kingdom in the hearts of all willing to accept his reign. For such persons, there was no longer any law or rule of duty; neither the Mosaic code, nor the Sermon on the Mount, nor the ordinances or institutions of civil society, were binding on them; they were a law unto themselves; they were free to do as they pleased, but—with exceptions which, however, could not invalidate an eternal truth—under the influence of the Divine Spirit, which dwelt in them, they could do only that which was right: they were *perfect*—hence their name.

He and his converts, men and women with their children, established themselves at Putney, Vt., and put their property into a common stock: they gave up the use of prayer, all religious service, and the observance of the Lord's Day; they renounced allegiance to the United States, and set up their 'Family' in 'celestial order;' those who were married renounced their marriage ties, and a 'complex marriage' was established between all the males and all the females of the 'Family.' Noyes found it necessary to add to his original principles, that the Family was wiser than the individual, who *might* stray from the path of grace; that the inclinations of individuals must be submitted to the opinion of the Family. Having dispensed with law, he set up public opinion as a controlling power in its stead. Quarrelling, however, broke out among the members; their differences were brought before the law courts; and when the details of the Family system became known, the people of Putney made the place too hot for the Perfectionists. Their establishment was broken up; but a portion of the Putney Family—about 50 men, as many women, and about the same number of children—soon established themselves in a new home, in a then sequestered district in Oneida, N. Y.

At Oneida creek, the new 'Family' purchased about 600 acres of forest-land, and proceeded to bring it under cultivation. They made it one of the most productive estates in the Union; they also established manufactures of various kinds; and in the course of 30 years, they became a prosperous and even a wealthy community of about 250 persons. The men wore no particular garb, but usually dressed like the country people around them: the women had their hair cut short, and parted down the centre; abjured stays and crinoline; wore a tunic falling to the knee, and trousers of the same material; a vest buttoning high toward the throat; and a straw hat. Their neighbors became accustomed to the P. and their ways, and let them live in peace. On settling at Oneida, the controlling function of criticism was strengthened by being made more systematic; and its operation was met

submissively. The industry of each for the common good was thus secured. The more advanced members abstained from animal food; they drank no beer, and only a weak home-made wine; and had nothing to do with doctors. In 1874 the community comprised 238 persons. A branch soc. of 40 members was established at Wallingford, Conn.

While all the males and females of the 'Family' were united by a 'complex marriage,' their intercourse—which, in theory, is unfettered by any law—is and was, in practice, subject to considerable regulation, based mostly on what were claimed to be scientific principles. There are four things, according to Noyes, necessary to the organization of a true family: (1) the reconciliation of its members with God; (2) their salvation from sin; (3) recognition of the brotherhood and equality of man and woman; (4) community of labor and its fruits. Communism, he asserts, can prosper only when the previous conditions exist. The Perfectionist theory is that for reconciliation to God and salvation from sin nothing is necessary but 'faith:' this faith seems merely their name for self-will; let a man believe that he is reconciled to God, and his sins are immediately washed away. It is instantly evident what is the real meaning and effect of such 'perfection' as this.

The open immorality of the community at length led many citizens to petition the legislature for its suppression. In consequence of the growing pressure of public sentiment, Noyes, with a few adherents, removed to Canada, where he died 1886; the remaining members practically gave up their peculiar tenets, and organized a joint-stock company 1881, incorporated as the Oneida Community, Limited. There are 250 stockholders, with capital $600,000 and a large surplus. The company cultivates about 600 acres of land, cans great quantities of fruit and vegetables, has a large factory in which steel-traps are made, and a silk factory which employs 100 hands. The branch at Niagara Falls manufactures tableware. Questions concerning the relative property rights of the members and incorporators were submitted to a referee appointed by the supreme court of the state 1889.

PERFIDIOUS, a. *pėr-fĭd'ĭ-ŭs* [L. *perfidĭōsus*, false, faithless—from *perfĭdus*, treacherous; *perfidĭa*, perfidy—from *per*, without, from the notion of *going through* and leaving; *fides*, faith: It. *perfido;* F. *perfide*, perfidious]: false to trust or confidence reposed in; treacherous; proceeding from treachery; false-hearted. PERFID'IOUSLY, ad. *-lĭ*, in a perfidious manner; treacherously. PERFID'IOUSNESS, n. *-nĕs*, or PERFIDY, n. *pėr'fĭ-dĭ*, violation of faith or trust reposed in; treachery; faithlessness.—SYN. of 'perfidious': traitorous; disloyal: unfaithful; faithless.

PERFLATION, n. *pėr-flā'shŭn* [L. *perflātus*, a blowing through—from *per*, through: *flo*, I blow]: the act of blowing through.

PERFOLIATE, a. *pėr-fō′li-āt* [L. *per*, through; *foliātus*, leaved—from *folium*, a leaf: F. *perfolié*]: in *bot.*, applied to a leaf with the lobes of the base so united as to appear as if the stem ran through it.

PERFORATE, v. *pėr′fō-rāt* [L. *perforātus*, bored through—from *per*, through; *foro*, I bore or pierce: It. *perforare:* F. *perforer*]: to pierce with a pointed instrument; to make holes by boring or pressure. PER′FORATING, imp. PER′FORATED, pp.: ADJ. bored or pierced. PER′FORATOR, n. *-tėr*, an instrument that pierces holes. PER′FORABLE, a. *-fō-rā-bl*, that may be pierced. PER′FORA′TION, n. *-fō-rā′shŭn* [F.—L.]: the act of boring or piercing through; a hole or aperture passing through. PER′FORATIVE, a. *-rā-tĭv*, having power to perforate.

PERFORCE, ad. *pėr-fōrs′* [L. *per*, by or through, and *force*]: by force; violently.

PERFORM, v. *pėr-fawrm′* [OE. *perfourne*, to complete: OF. *parfournir*, to consummate, to perform—from *par*, thoroughly, for L. *per*, and *fornir*—the modern *fournir*, to furnish, to complete: OHG. *frumjan*, to procure]: to execute thoroughly or completely; to do; to carry out; to complete; to achieve; to play on an instrument; to represent or act a part upon the stage. PERFORM′ING, imp.: N. act done; act of executing. PERFORMED′, pp. *-fawrmd′*. PERFORM′ER, n. *-ėr*, one who makes an exhibition of his skill, as on an instrument of music, or on the stage. PERFORM′ABLE, a. *-ă-bl*, that may be done; practicable. PERFORM′ANCE, n. *-ăns*, the carrying out or completion of a thing; an acting on the stage; an entertainment provided at any place of amusement; something written or produced; something done; a feat or exploit; a deed. PERFORMANCE OF CONTRACTS, one of the modes of satisfying the contract, which may be either by doing some specific thing, or not doing something, or by payment of money. It is a good answer to any action brought by one party against another, for breach of contract, that what was contracted for has been already performed.—SYN. of 'perform': to accomplish; effect; do; act; transact; execute; discharge; fulfil; consummate; produce; work.

PERFUME, n. *pėr'fūm* or *pėr-fūm'* [F. *parfum*; It. *profumo*, any perfume or sweet smell—from F. *par*, for L. *per*, thoroughly, and F. *fumer*, to smoke—from L. *fumārĕ*, to smoke—from *fūmus*, smoke, vapor—*lit.*, to smoke thoroughly]: substance that affects agreeably the organs of smell by giving forth a vapor generally invisible; sweet odor; scent (see PERFUMERY): V. *pėr-fūm'*, to fill or impregnate with a sweet or grateful odor; to scent. PERFU'MING, imp.: N. the act of one who perfumes a thing; process by which anything is perfumed. PERFUMED', pp. *-fūmd':* ADJ. scented or impregnated with perfumes. PERFU'MER, n. *-fū'mėr*, one whose trade is to make or sell perfumes and other articles of the toilet. PERFU'MERY, n. *-mėr-ĭ*, perfumes in general; the articles sold by a perfumer (see below). PERFU'MATORY, a. *-mă-tėr-ĭ*, that perfumes.—SYN. of 'perfume, n.': fragrance; odor; smell; aroma.

PERFU'MERY: substances which give forth delicate odors or scents; also the art of preparing them. Perfumes are of three distinct classes when derived from plants; a fourth class is of animal origin.

CLASS I.—Various odoriferous gum-resins, which exude naturally from some trees; and to increase the produce, the plants are often purposely wounded. Perfumes of this class are the most ancient, and have been in use from the earliest recorded times. The most important are benzoin, olibanum, myrrh, and camphor. The export of these from eastern and tropical lands is immense—amounting to millions of lbs. annually. The import of crude camphor gum alone into the United States, in the year ending 1889, June 30, was 1,961,018 lbs., valued $287,333. Gum-resins form the chief ingredients in 'Incense' (q.v.) and in Pastils (q.v.).

CLASS II.—Perfumes procured by distillation. As soon as the Greeks and the Romans learned the use of the still, an invention imported from Egypt, they quickly adapted it to the separation of the odorous principle from the numerous fragrance-bearing plants indigenous to Greece and Italy. An essential oil or otto thus procured from orange-flowers bears in commerce to this day the name of Neroly, supposed to be named after Emperor Nero. Long before that time, however, fragrant waters were in use in Arabia. Odor-bearing plants contain the fragrant principle in minute glands or sacs; these are found sometimes in the rind of the fruit, as the lemon and orange; in others, in the leaves, as sage, mint, and thyme; in the wood, as rosewood and sandal-wood; in the bark, as cassia and cinnamon; in the seeds, as caraway and nutmeg. These glands or bags of fragrance may be plainly seen in a thin-cut stratum of orange-peel; also in a bay leaf, held up to the sunlight, all the oil cells may be seen like specks. All these fragrance-bearing substances yield by distillation an essential oil peculiar to each; thus is procured oil of patchouli from the leaves of the patchouli plant, *Pogostemon Patchouli*, native of Burmah; oil of caraway, from the cara-

way-seed; oil of geranium, from the leaves of the *Geranium rosa;* oil of lemon, from lemon-peel; and a hundred others in great variety.

The old name for these pure odoriferous principles was Quintessence: latterly, they have been termed Essential Oils; they are now, in modern scientific works, often termed Ottos, from the Turkish word attar, which is applied to the well-known otto or attar of roses: see Oils. All the various essential oils or ottos are very slightly soluble in water, so that in the process of distillation the water which comes over is always fragrant. Thus, elder-water, rose-water, orange-water, dill-water, are, as it were, the residue of the distillation for obtaining the several ottos. The process of Distillation (q.v.) is very simple: the fragrant part of the plant is put into the still and covered with water; and when the water is made to boil, the ottos rise with the steam, are condensed with it in the pipe, and remain floating on the water, from which they are easily separated by decanting. In this way 100 lbs. of orange, lemon, or bergamot fruit peel yield about 10 ounces fragrant oil; 100 lbs. of cedar-wood give about 15 ounces oil of cedar; 100 lbs. of nutmeg yield 60 to 70 ounces oil of nutmeg; 100 lbs. of geranium leaves yield 2 ounces oil. Every fragrant substance varies in yield of essential oil. The variety of essential oils is endless; but there is a certain relationship among odors as among tints. The lemon-like odors are most numerous, such as verbena, lemon, bergamot, orange, citron, citronella; then the almond-like odors, such as heliotrope, vanilla, violet; then spice-odors, cloves, cinnamon, cassia. All may be classified into 12 well-defined groups. All these ottos are very soluble in alcohol, in fat, butter, and fixed oils. They also mix with soap, snuff, starch, sugar, chalk, and other bodies, to which they impart their fragrance. Their principal consumption is for scenting soap.

Though snuff is in far less popular use than in the last century, yet increased population and increased facilities of export cause a production of scented snuff greater now than 50 years ago: it is in demand especially in the fur countries of n. Canada. There is large consumption of fragrant essential oils in the manufacture of toilet powders: a mixture of starch and orris, differently scented, is in general demand for drying the skin of infants after the bath. Precipitated chalk and powdered cuttle-fish bone, being perfumed with otto of roses, powdered myrrh, and camphor, become 'Dentifrice.' The ottos of peppermint, lavender, rose, and others, are extensively used in scenting sweetmeats and lozenges.

More than 200,000 lbs. of various ottos, valued more than £180,090, have been imported into Britain in one year; while at least one-third as much again was distilled in England.

Class III.—Perfumes proper, such as are used for perfuming handkerchiefs, etc. Contrary to the general belief, nearly all the perfumes derived from flowers are

not made by distillation, but by the processes of *enfleurage* and *maceration*. Although this mode of obtaining the odors from flowers has certainly been in practice for two centuries in the valley of the Var, in s. France, it is only by the publication of a recent work that the method has been made generally known (see *Art of Perfumery*, by Septimus Piesse, PH.D., 8vo, 50 cuts; Longman; 4th ed. 1880). The odors of flowers do not, as a general rule, exist in them as a store or in a gland, but are developed as an exhalation. While the flower breathes, it yields fragrance; kill the flower, and fragrance ceases. It has not been ascertained when the discovery was made of condensing, as it were, the breath of the flower during life; what we know now is, that if a living flower be placed near to grease, animal fat, butter, or oil, these bodies absorb the odor given off by the blossom, and in turn themselves become fragrant. If we spread fresh unsalted butter on the bottom of two dessert-plates, and then fill one of the plates with gathered fragrant blossoms of clematis, covering them over with the second greased plate, we shall find that after 24 hours the grease has become fragrant. The blossoms, though separated from the parent stem, do not die for some time, but live and exhale odor; which is absorbed by the fat. To remove the odor from the fat, the fat must be scraped off the plates and put into alcohol; the odor then leaves the grease and enters into the spirit, which thus becomes 'scent,' and the grease again becomes odorless.

The flower farmers of the Var follow precisely this method on a very large scale, with little practical variation, with the following flowers—rose, orange, acacia, violet, jasmine, tuberose, and jonquil. The process is termed *enfleurage*. In the valley of the Var, there are acres of Jasmine, of tuberose, of violets, and the other flowers named; in due season the air is laden with fragrance—the flower harvest is at hand. Women and children gather the blossoms, which they place in little panniers like fishermen's baskets, hung over the shoulders. They are then carried to the laboratory of flowers, and weighed. In the laboratory the harvest of flowers has been anticipated. During the previous winter, great quantities of grease, lard, and beef-suet have been collected, melted, washed, and clarified. In each laboratory are several thousand *châssis* (sashes), or framed glasses, upon which the grease to be scented is spread, and on this grease the blossoms are sprinkled or laid. The *châsse en verre* is, in fact, a frame with a glass in it as near as possible like a window-sash, only that the frame is two inches thicker, so that when one châsse is placed on another there is a space of four inches between every two glasses, thus allowing space for blossoms. The illustration shows the châsse with grease and flowers upon it (fig. 1), also a pile of the same as in use. The flower blossoms are changed every day, or every other day, as may be convenient in regard

to the general work of the laboratory or flowering of the plants. The same grease, however, remains in the châsse so long as the particular plant being used yields blossoms. Each time the fresh flowers are put on, the grease is 'worked'—that is, serrated with a knife—so as to offer a fresh surface of grease to absorb odor. The grease being *enfleurée* in this way for three weeks or more—in fact, so long as the plants produce blossoms—is at last scraped off the châsse, melted, strained, and poured into tin canisters, and is now fit for exportation. Fat or oil is perfumed with the same flowers by the process of maceration—that is, infusion of the flowers in oil or melted fat. For this end, purified fat is melted in a *bain-marie*, or warm bath, and the fresh blossoms are infused in it for several hours. Fresh flowers being procured, the spent blossoms are strained away, and new flowers added repeatedly, so long as they can be procured. The *bain-marie* is used in order to prevent

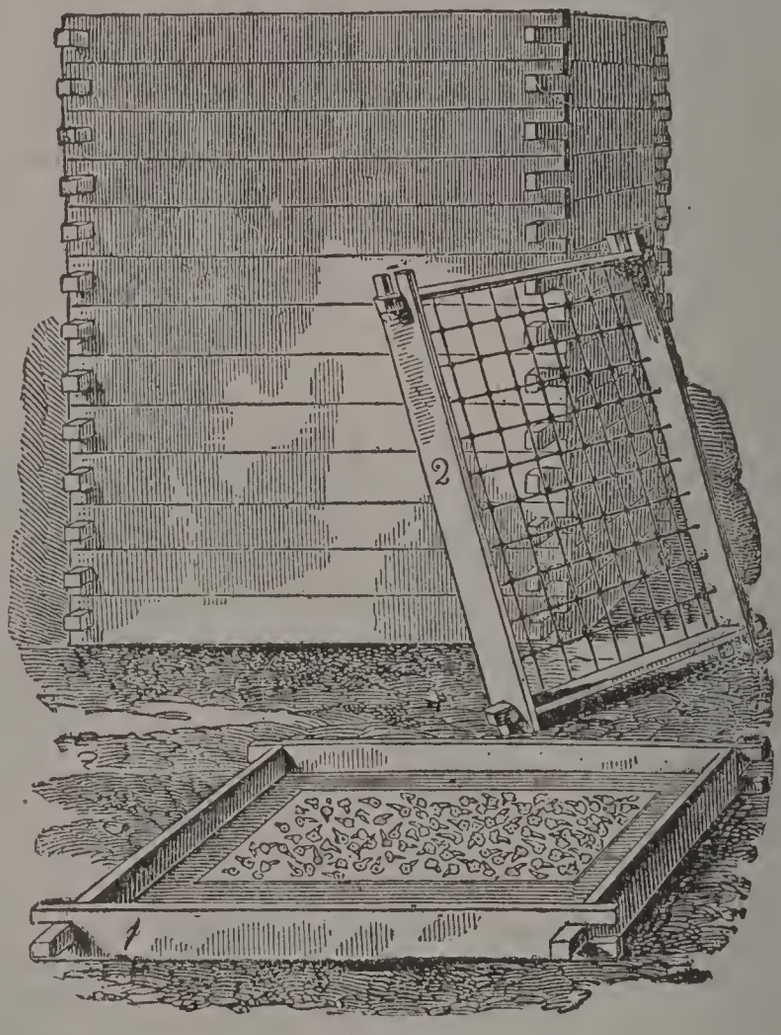


Fig. 1.
1, Châssis en Verre; 2, Châssis en Fer.

the grease becoming too hot from exposure to the naked fire; so long as the grease is fluid, it is warm enough. Oil does not require to be warmed, but improved results are obtained when it is slightly heated.

Jasmine and tuberose produce best perfumed grease by enfleurage; but rose, orange, and acacia give more satisfactory products by maceration; while violet and

jonquil grease is obtained best by the joint processes—enfleurage followed by maceration. The *châsse en fer* (2, fig. 1) is for enfleurage of oil. Instead of glass, the space is filled with a wire net; on which is laid a *molleton*, or thick cotton fabric—moleskin, soaked with oil; on this the flowers are laid, just as with solid grease. In due time—that is, after repeated changing the flowers—the oil becomes fragrant, and it is then pressed out of the moleskin cloth. Oil of jasmine, tuberose, etc., is prepared in this way. In order now to obtain the perfume of these flowers in the form for scenting handkerchiefs, it is requisite only to infuse in strong alcohol the scented fat or oil, made by any of the above

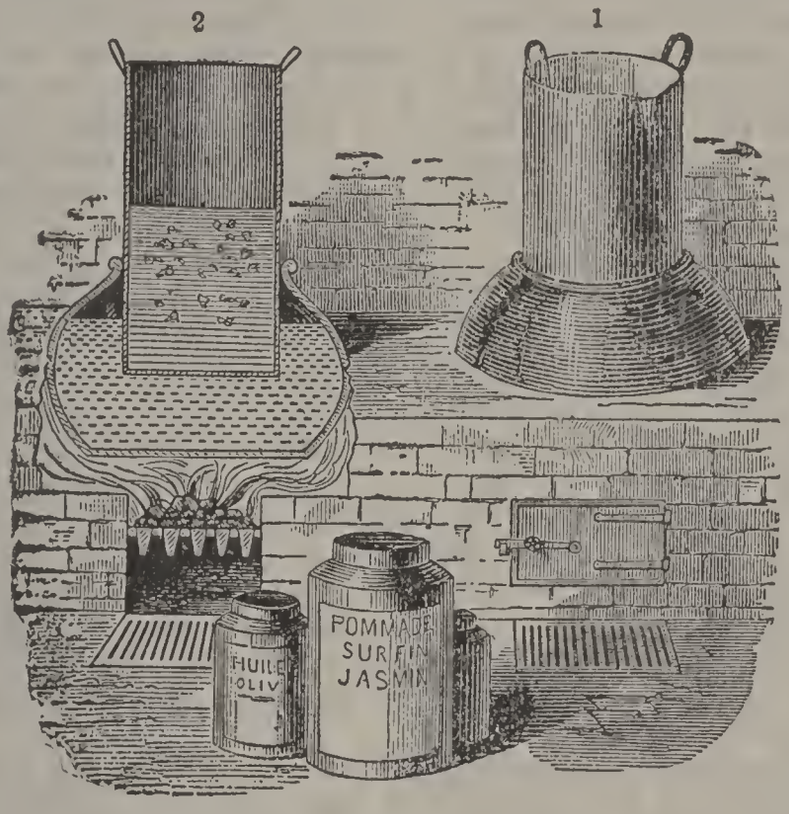


Fig. 2.
1, Bain-marie; 2, Section of Bain-marie.

methods. In extracting the odor from solid fat it has to be chopped up fine as suet is chopped, put into the spirit, and left to infuse for about a month. Scented oil has to be repeatedly agitated with the spirit. The result is, that the spirit extracts all the odor, becoming itself 'perfume,' while the grease again becomes odorless; thus is procured the essence of jasmine, essence of orange-flowers, essence of violets, and others above named, rose, tuberose, acacia, and jonquil.

It is remarkable that these flowers yield perfumes which, either separate or mixed in various proportions, are types of nearly all flower odors; thus, when jasmine and orange-flowers are blended, the scent produced is like sweet-pea; when jasmine and tuberose are mixed, the perfume is that of the hyacinth. Violet and tuberose

resemble lily of the valley. All the various bouquets and nosegays, such as 'frangipane,' 'white roses,' 'sweet daphne,' are made on this principle.

The commercial importance of this branch of perfumes is indicated by the quantity of flowers annually grown in the district of the Var. Flower harvest: orange-blossoms 1,475,000 lbs.; roses 530,000 lbs.; jasmine 100,000 lbs.; violets 75,000 lbs.; acacia 45,000 lbs.; geranium 30,000 lbs.; tuberose 24,000 lbs.; jonquil 5,000 lbs.

Class IV.—Perfumes of animal origin—The principal are Musk (q.v.), Ambergris (q.v.), Civet (q.v.), and Castor (q.v.). The aroma of musk is the most universally favorite of all perfumes; it freely imparts odor to every body with which it is in contact. Its power to impart odor is such, that polished steel will become fragrant of it if the metal be shut in a box where there is musk, contact not being necessary. In perfumery manufacture, musk is mixed with other odorous bodies to give permanence to a scent. The usual statement as to the length of time that musk continues to give out odor has been called in question. If fine musk be spread in thin layers upon any surface, and fully exposed to a changing current of air, all fragrance, it is said, will be gone in six to twelve months. Civet is exceedingly potent as an odor, and when pure, and smelled at in the bulk of about an ounce, is utterly insupportable from its nauseousness: in this respect it exceeds musk. When, however, civet is diluted so as to offer but minute quantities to the alfactories, then its perfume is generally admitted; this is so with gas-tar; but the fragrant principles is the same as that breathed by the beautiful narcissus. Castor is in our day almost obsolete as a perfume.

The average importation into Great Britain of musk per annum for a period of five years was 9,388 ounces, value £10,688; export 1,578 ounces, value £2,143; leaving for home consumption every year 7,810 ounces, value £8,545. Average importation per annum for a similar period: otto of roses 1,117 ounces, value £13,561; vanilla 3.525 lbs., value £12,568; ambergris 225 ounces, value £225; civet 355 ounces, value £300; orris-root 420 hundred-weight. Imports into the United States, of perfumery, cosmetics, and all toilet preparations, for year ending 1906, June 30, were valued $1,054,426 and of volatile or essential oils $2,863,005. Exports of volatile or essential oils were valued at $665,793; of general perfumery and cosmetics $534,095.

The works on perfumes are very few; that of Madame Celnart, in the Libraire Roret, is most worthy of notice among the French (transl. by C. Morfit, Philadelphia). In England, *The British Perfumer*, by C. Lilly (1822), was the only work prior to the *Art of Perfumery* noticed above (1855): see also Rimmel's *Book of Perfumes* (1875)

PERFUNCTORY, a. *pėr-fŭngk'tėr-ĭ* [L. *perfunctus*, discharged, performed—from *per*, through, thoroughly; *functus*, performed: It. *perfuntorio:* Sp. *perfunctorio*]: done only with the view of getting through duty; done carelessly or superficially; negligent. PERFUNC'TORILY, ad. *-rĭ-lĭ.* PERFUNC'TORINESS, n. *-nĕs*, negligent performance.

PERGAMENEOUS, a. *pėr'gă-mē'nē-ŭs*, or PER'GAMENTA'CEOUS, a. *-tā'shŭs* [L. *pergamēna*, parchment—from *Pergamos*, in Asia Minor, where parchment-making was first developed as a trade (see PARCHMENT)]: resembling parchment; of the texture of parchment.

PER'GAMOS, properly PER'GAMUM: anciently a city of Mysia in Asia Minor, on the navigable river Caïcus, 13 to 14 m. from its mouth. According to tradition, the place was of Greek origin. It acquired prominence first when Lysimachus, one of Alexander's generals, chose it as a stronghold for his treasures. Under Philetærus it became cap. of a state B.C. 283. His successor, Eumenes I., maintained its independence against the Seleucidæ, though the title of king was assumed first by Attalus I., who reigned B.C. 241–197. He allied himself with the Romans against Philip of Macedon; and this alliance subsisted throughout succeeding reigns, in which the kingdom increased in extent and importance, till at last Attalus III., surnamed Philometer (d. B.C. 133), left it with all his treasures to the Romans, who successfully maintained the right thus acquired, and under whom the city continued to flourish. It was the focus of all the great military and commercial routes of Asia Minor, and Pliny describes it as *longe clarissimum Asiæ Pergamum.* The Attali collected in P. a library inferior only to that of Alexandria: it contained 200,000 rolls; it was finally removed to Alexandria, as Antony's gift to Cleopatra, and there met destruction. P. was also the seat of a famous grammar school, and is said to have given its name to Parchment (q.v.). It was the seat of Æsculapian worship, and had a distinguished medical school. It was the scene of one of the earliest triumphs of Christianity, and of one of the first persecutions, and contained one of the 'seven churches of Asia' (Rev. i. 11, ii. 12–17).—P. sank under the Byzantine emperors, but the place still exists under the name *Bergamah,* and is noted for the magnificence of its ruins —temples, palaces, aqueducts, gymnasia, amphitheatres, and city walls.

PERGOLESI, *pĕr-go-lā'sē* (or PERGOLE'SE, *pĕr-go-lā'sā*), GIOVANNI BATTISTA: Italian musician of the Neapolitan school: 1710, Jan. 3—1736, Mar. 16; b. Jesi, near Ancona (according to Marchese di Villarosa, his latest biographer). In 1717 he was admitted into the Conservatorio dei Poveri di Gesù Cristo at Naples, and studied the violin under Domenico di Matteis, and musical composition under Gaetano Greco and Durante.

Under the conviction that melody and taste were sacrificed to learning by most of the masters of his time, he abandoned the style of Scurlatti and Greco for that of Vinci and Hasse. Failing at first in opera, he turned to sacred music, and his first two masses immediately established his reputation as a composer. His first great work was the oratorio *San Guglielmo d'Aquitania*, 1731. In that and the following year appeared his operas *La Serva Padrona* (an operetta), *Il Prigionier Superbo*, and *Lo Frate Innamorato*; 1734, *Adriano in Siria;* 1735, *Il Flaminio* and *L'Olimpiade.* In 1734 he received the appointment *maestro di capella* of the Church of Loretto. In consequence of delicate health, he removed to Pozzuoli, where he composed the cantata *Orfeo*, and his pathetic *Stabat Mater*, for which he was paid in advance 10 ducats (about $8.65), and deemed the compensation large. He died there of consumption. P. composed a number of pieces for the church, which were better appreciated during his lifetime than his secular compositions; also a violin concerto, and 30 trios for violin, violoncello, and harpsichord. All his works are characterized by sweetness and freedom of style. *La Serva Padrona* is still a favorite: in 1754 it ran in Paris 150 nights in succession (in French transl.); and was revived at the Opéra Comique 1867, and at the Royalty Theatre, London, 1873.

PERHAPS, ad. *pĕr-hăps'* [L. *per;* F. *par*, by, and Eng. *hap*, luck, chance]: by chance; possibly.

PERI-, *pĕr'ĭ* [Gr. *peri:* Skr. *pari*, round about]: a Greek prefix signifying around; about; near; with.

PERI, n. *pēr'ĭ* [Pers. *pari;* Avestan, *pairi*, fairy]: in *Pers. myth.*, spiritual being of lower order; an elf or fairy. According to the mythical lore of the East, a P. is a descendant of the fallen spirits, which spends its life in all imaginable delights, is immortal, but is excluded from Paradise till its ancestral spirits shall have fulfilled their penance through long ages. It takes an intermediate place between angels and demons, and is either male or female. So far from there being only female Peris, as is supposed by some, and these the wives of the Devs, the Peris, on the contrary, are in constant strife with these Devs. Otherwise, they are quite innocuous to mankind; and, like the fairies of our popular mythology, are, when female, of surpassing beauty. One of the finest compliments to be paid to a Persian lady is to speak of her as Perizadeh (born of a Peri; Greek, Parisatis). Peris belong to the great family of genii, or jinn: a belief in whom is enjoined in the Koran, and for whose conversion, as well as for that of man, Mohammed was sent (see Koran, lv., lxxii., lxxiv.).

PERIAGUA, *pĕr-ĭ-â′gwâ* (formerly PERIAUGUA, *pĕr-ĭ-aw′gwâ*, etc.; properly PIRAGUA, *pĭ-râ′gwâ*): term from the Spanish (W. Indian), variously applied to large canoes and flat-bottomed boats in different countries. One kind is a large canoe composed of the trunks of two trees, hollowed and united into one fabric; whereas an ordinary canoe is formed of the body of one tree only. Periaguas are used in the Pacific, and were formerly much used among the W. I. Islands, on the lower Mississippi, and on the coast of the Carolinas.

PERIANDER, *pĕr-ĭ-ăn′dėr:* B.C. 665–585: despot of Corinth, in succession to his father Cypselus, B.C. 625. His rule was at first mild and beneficent, but afterward he became a cruel tyrant. He murdered his wife at the instigation of his concubines, but in a fit of remorse burned the concubines alive. He reduced tyranny to a system by putting down eminent and aspiring citizens and sowing distrust between classes and individuals. By his constant wars he wasted the energies and distracted the attention of the citizens. But his foreign conquests enriched Corinth and gave her prestige among the Grecian states. He was not only a patron of literature, but was himself the author of a collection of moral maxims in 2,000 verses; he was even reckoned among the 'seven sages of Greece.' He banished to Corcyra his son Lycophron, and when in his old age he purposed to resign to Lycophron the tyranny, and himself to retire to Corcyra, the Corcyreans, alarmed, put Lycophron to death. P. in revenge shipped 300 of the noblest Corcyrean youths to Alyattes, King of Lydia, to be made eunuchs of, but the Samians rescued them from that fate.

PERIANTH, n. *pĕr′ĭ-ănth*, or PERIAN′THIUM, n. *-ăn′-thĭ-ŭm* [Gr. *peri*, around; *anthos*, a flower]: in *bot.*, the external floral whorls which surround the stamens and pistil—in this sense including calyx and corolla, which in some plants are not easily distinguished (see FLOWER). P. is a convenient term, as it can be applied indifferently to calyx and corolla; thus, when there is either a calyx or corolla, but not both, the P. is said to be *single;* when both are present, *double.* Both are really present in many endogenous plants, to which the use of the term P. is confined by some botanists; the single floral envelope of exogenous plants being regarded as a calyx, and the corolla supposed to be lacking. The P. is *regular* in some plants, *irregular* in others. It often displays great beauty, as in tulips, crocuses, lilies, etc. PER′I-AN′THAL, a. *-ăn′thăl*, of or pertaining to a perianth; staminal.

PERIAPT, n. *pėr′ĭ-ăpt* [Gr. *peri*, around; *haptō*, I fasten]: in *OE.*, an amulet; something worn as a charm or preservative against evil or danger.

PERIASTRAL, a. *pĕr-ĭ-ăs′tral:* around or among the stars: N. a body passing around or among the stars.

PERIASTRON, n. *pĕr-ĭ-ăs′tron:* in *astron.*, the point of nearest approach of the components of a binary star.

PERIBLEM, n. *pĕr′ĭ-blĕm* [Gr. *periblēma*, clothing, a cloak—from *peri*, around; *ballō*, I throw]: in *bot.*, a collection of layers of cells beneath the covering of the skin in plants—out of which the cortex arises.

PERIBOLOS, n. *pĕ-rĭb′ō-lŏs* [Gr. *peri*, around; *ballō*, I cast]: in *anc. arch.*, a court or inclosure within a wall; the wall which surrounds a temple.

PERICAMBIUM, n. *pĕr′ĭ-kăm′bĭ-ŭm* [Gr. *peri*, around: new L. *cambium*, nutriment]: in *bot.*, the outer layer of the plerome, from which lateral roots arise.

PERICARDITIS, *peri′i-cär-dī′tis* or *-dĭ′tis*, (Gr. *peri-kardion*,—*peri* around; *kardia*, heart, and *-itis*, inflammation): inflammation of the pericardium, or the serous membrane covering of the heart.

Pericarditis is practically the only disease of importance involving the pericardium. Pericarditis is almost invariably secondary to a disease process in some other part of of the body. Primary or idiopathic pericarditis is exceedingly rare; such may be caused by blows upon the pericardium or as occurs occasionally by the entrance of some foreign body by way of the esophagus making its way through the tissues. Pericarditis is in almost all cases caused by bacteria and usually secondary to some bacterial disease in other parts of the body. In the majority of cases it occurs in connection with acute articular rheumatism which is now admitted to be caused by a germ. It is estimated that about 6 per cent. of all cases of rheumatism develop a pericarditis. It is also found to be associated with scarlet fever, pneumonia and tuberculosis and more rarely in typhoid fever, measles, diphtheria and pyogenic infections. Microorganisms that may produce pericarditis are the pneumococci, staphylococci, streptococci, tubercle bacilli, typhoid bacilli, colon bacilli, etc. By extension it may be involved secondary to pleurisy. In childhood it usually follows scarlet fever and rheumatism; in later life, it occurs more in connection with tuberculosis, Bright's disease and gout.

Pathology.—In the mild forms of the disease there is a marked accumulation of serous fluid which may attain considerable proportions—as much as one or two quarts may accumulate around the heart, although ordinarily it is considerably less. When the accumulation of fluid is the only pathological condition it is called serous pericarditis. As a rule, however, there is usually the formation of some fibrin as a result of the coagulation of the serous fluid. It is deposited on both the visceral and parietal layers of the pericardium, and by being constantly rubbed together on account of the movement of the heart causes these membranes to present a roughened appearance, which is the so-called hairy heart or 'cor villosum' of old writers, and because of its resemblance to a piece of bread and butter, the surfaces of which have

been pulled apart, it is sometimes called 'bread and butter' heart or in pathological terms fibrinous or plastic pericarditis; often there is present both serum and fibrin and it is called a sero-fibrinous pericarditis. If pus-producing bacteria such as staphylococci and streptococci gain entrance the inflammatory exudate will consist of pus and it is called a purulent or suppurative pericarditis or pyopericardium. In severe infections such as severe cases of blood poisoning or septicemia the inflammatory exudate often contains a large amount of blood and it is proper to speak of it as a hemorrhagic pericarditis. In tuberculosis the process usually begins as a serous pericarditis and continues and terminates as a sero-fibrinous inflammation with caseation of the deeper parts. Pericarditis may be local, i. e. involving only a small portion of the pericardium but usually is general, involving the entire surface. The course of pericarditis varies from several days to a week in acute cases; to several weeks in sub-acute cases; to several years in chronic cases. In a mild form it usually terminates by absorption of the inflammatory exudate (resolution). When the fibrinous exudate is formed it usually undergoes organization, that is, it is invaded by blood vessels and connective tissue resulting as a rule in the forming of adhesions between the two walls of the pericardium. In the mild serous and fibrinous forms the prognosis is usually fairly good; in the more severe, especially the suppurative and tuberculous forms, the prognosis is bad and usually terminates fatally.

Symptoms of Pericarditis.—In the very simple forms there may be but few symptoms. As a rule, there is pain,—frequently sharp and stabbing in character with a sense of distress and discomfort about the heart. If there is a large amount of fluid not only does it interfere with the beat of the heart causing the pulse to be small and the beat to be more rapid and weak, but also by pressing upon the lungs and trachea it causes difficulty of breathing. Because of the fact that it is usually caused by bacteria there is almost invariably some fever, restlessness, sleeplessness, and in the latter stage frequently delirium and coma. If a large amount of fluid is present a bulging in the region of the heart can easily be noticed especially in children.

Treatment.—Pericarditis is too serious an affection to require anything but the best of medical attention. The patient should be quiet so as to reduce the heart's action to a minimum. Application of cold to the inflamed area is often of much value and sometimes applications of blisters to the part causes the fluid in the pericardial sac to dissappear. Drugs which will carry away fluid by means of the kidneys and the gastro-intestinal tract are often of much value. Sometimes it is necessary to tap the pericardium in order to remove the fluid when in excess and when it interferes with the beat of the heart.

PERICARDIUM, n. *pĕr'ĭ-kär'dĭ-ŭm* [Gr. *perikar'dĭŏs*, being round the heart—from *peri*, round; *kardĭa*, the

heart: It. *pericardio:* F. *péricarde*]: conical membranous sac, containing the heart and the commencement of the great vessels to the extent of about two inches from their origin. It is placed with its apex upward behind the sternum, and to the left side, in the interval between the pleuræ—the serous sacs in which the lungs are inclosed; while its base is attached to the diaphragm. It is a fibro-serous membrane, consisting of an external fibrous and an internal serous layer. The fibrous layer is a strong, dense, fibrous membrane; the serous layer invests the heart, and is then reflected on the inner surface of the fibrous layer; and it therefore consists in reality of two layers or portions—a visceral portion, surrounding the heart, and a parietal portion, reflected on the fibrous layer. A single fold of the serous layer of the pericardium encloses the aorta and pulmonary artery. Like all serous membranes, it is a closed sac; its inner surface is smooth and glistening, and secretes a thin fluid which serves to facilitate the natural movements of the heart. PER'ICAR'DIA, n. plu. *-dĭ-ă*, the two surfaces of the membrane, one closely adherent to the heart, and the other containing it as a bag. PER'ICAR'DIAC, a. *-ăk*. PER'ICAR'DIAN, a. *-ăn*, and PER'ICAR'DIAL, a. *-dĭ-ăl*, pertaining to the pericardium. PERICARDITIS, n. *pĕr'ĭ-kâr-dī'tĭs*, inflammation of the serous membranous sac which surrounds the heart. See PERICARDITIS; HEART, DISEASES OF THE.

PERICARP, n. *pĕr'ĭ-kârp*, or PER'ICAR'PIUM, n. *-pĭ-ŭm* [L. *perĭcar'pĭum*—from Gr. *perikar'pĭŏn*, the covering of seed—from *peri*, around; *karpos*, fruit]: that which surrounds or incloses the seed of a plant; the shell or rind; the part of the fruit immediately investing the seed (see FRUIT). PER'ICAR'PIAL, a. *-pĭ-ăl*, of or pertaining to a pericarp. PERICARPOIDAL, a. *pĕr'-kâr-poy'dăl* [Gr. *eidos*, resemblance]; in *bot.*, having the appearance of a pericarp or wall of a fruit, as in the chestnut and overcup-oaks, where the cupula quite surrounds the fruit.

PERICHÆTIUM, n. *pĕr'ĭ-kē'shĭ-ŭm* [Gr. *peri*, around; *chaitē*, long, loose, flowing hair, as that of the mane of a horse—hence metaphorically applied to the foliage of trees]: a name applied to the leaves that surround the base of the fruit-stalk of some mosses. PER'ICHÆ'TIAL, a. *-shĭ-ăl*, pertaining to the perichætium.

PERICHRONDRIUM, n. *pĕr'ĭ-kŏn'drĭ-ŭm* [Gr. *peri*, about; *chondros*, cartilage]: in *anat.*, the fibrous membrane covering cartilages.

PERICLADIUM, n. *pĕ'ĭ-klā'dĭ-ŭm* [Gr. *peri*, around; *klados*, a shoot of a tree broken off for grafting—from *klaō*, I break]: in *bot.*, the lowermost clasping portion of sheathing petioles.

PERICLASE, n. *pĕr'ĭ-klās* [Gr. *peri*, around; *klasis*, cleavage—from *klaō*, I break]: a Vesuvian mineral consisting of magnesia with a perfect cubic cleavange, occurring in grains of a dark-green color, found in ejected masses of white limestone.

PERICLES, *pĕr'ĭ-klēz* (Gr. PERIKLES): the most accomplished statesman of ancient Greece: born of distinguished Athenian parentage in the early part of B.C. 5th c.; d. B.C. 429, autumn. His father was that Xanthippus who won the victory over the Persians at Mycale, B.C. 479; and his mother, Agariste, was niece of the great Athenian reformer Cleisthenes, and was connected with the great house of the Alcmæonidæ. P. received an elaborate education; but of all his teachers, the one whom he most reverenced, and from whose instructions he derived most benefit, was the philosopher Anaxagoras (q.v.). P. was conspicuous all through his career for the singular dignity of his manners, the 'Olympian' thunder of his eloquence, his sagacity, probity, and profound Athenian patriotism. When he entered on public life, Aristides had only recently died, Themistocles was an exile, and Cimon was fighting the battles of his country abroad. Although the family to which he belonged was good, it did not rank among the first in either wealth or influence; yet so transcendent were the abilities of P., that he rapidly rose to the highest power in the state as the leader of the dominant democracy. The sincerity of his attachment to the 'popular' party has been questioned, but without the shadow of evidence. At any rate, the measures which either personally or through his adherents he brought forward, and caused to be passed, were always in favor of extending the privileges of the poorer class of the citizens. P. seems to have grasped very clearly, and to have held as firmly, the modern 'radical' idea, that as the state is supported by the taxation of the body of the citizens, it must govern with a view to general and not to *caste* interests. B.C. 461, P., through the agency of his follower, Ephialtes, struck a great blow at the influence of the oligarchy, by causing the decree to be passed which deprived the Areopagus of its most important political powers. Shortly afterward the democracy obtained another triumph in the ostracism of Cimon. During the next few years the political course pursued by P. is not clearly discernible, but in general his attitude was hostile to the desire for foreign conquest or territorial aggrandizement, so prevalent among his ambitious fellow-citizens. B.C. 454, or shortly afterward, he magnanimously proposed the measure (which was carried) for the recall of Cimon, and about the same time commenced negotiations with the other Hellenic states with the view of forming a grand Hellenic confederation, the design of which was to put an end to the mutually destructive wars of kindred peoples—to make of Greece one mighty nation, fit to front the outlying world. The idea was sagacious and noble. Had it been accomplished, the semi-barbarous Macedonians would have menaced the civilized Greeks in vain, and even Rome at a later period might perhaps have found the Adriatic, and not the Euphrates, the limits of her empire. But the Spartan aristocrats were utterly incapable of mor-

ally appreciating such exalted patriotism, or of understanding the political necessity for it, and by their secret intrigues brought the well-planned scheme to naught. Athens and Sparta had for some time been in that mood toward each other which rendered the future Peloponnesian war inevitable. They are found always on opposite sides. When the Spartans, B.C. 448, restored to the Delphians the guardianship of the temple and treasures of Delphi, of which they had been deprived by the Phocians, the Athenians immediately marched an army thither, and reinstated the Phocians. Three years later, an insurrection broke out in the territories tributary to Athens—Megara, Eubœa, etc.—and the Spartans again appeared in the field as the allies of the insurgents. The position of Athens was critical. Pericles wisely declined to fight against all his enemies at once. A bribe of ten talents sent the Spartans home, and the insurgents were then rapidly and thoroughly crushed.

Cimon was succeeded in the leadership of the aristocratical party by Thucydides, son of Milesias, who, B.C. 444, made an effort to overthrow the supremacy of P. by attacking him in the popular assembly for squandering the public money on buildings, and in festivals and amusements. Thucydides made an effective speech; but P. immediately rose and offered to erect the buildings at his own expense, if the citizens would allow him to put his own name upon them instead of theirs. The sarcasm was successful, and P. was empowered to do as he pleased. But P. did not mean to be simply sarcastic; he wished to point out to the Athenians in a delicate way the spirit and aim of his policy, which was to make Athens, as a city, worthy of being the head and crown of Hellas. His victory in the assembly was followed by the ostracism of Thucydides; and during the rest of his career 'there was,' says the historian Thucydides, 'in name a democracy, but in reality a government in the hands of the first man.' The same author, however, informs us that P. never did anything unworthy of his high position; that he did not flatter the people, or oppress his adversaries; and that, with all his unlimited command of the public purse, he was incorruptibly honest. Soon the Samian war broke out, in which P. acquired renown as a naval commander. This war originated in a quarrel between the Milesians and Samians, in which Athens was led to take part with the Milesians. The Samians, after an obstinate struggle, were beaten, and a peace was concluded B.C. 440. The position in which Athens then stood toward many of the Greek states was peculiar. Since the time of the Persian invasion she had been the leader of the confederacy formed to resist the attacks of the powerful enemy, and the guardian of the confederate treasury kept in the isle of Delos. P. removed the treasury to Athens; and, committing the contingents of the al-

PERICLES.

lies for money—Athens, of course, herself undertaking to protect the confederacy—enormously increased the contributions to the 'patriotic fund.' The grand charge against P. is, that he applied the money thus obtained to other purposes than those for which it was designed; that, in short, he adorned and enriched Athens with the spoils of the allied states. But the objection is more plausible than solid, for, in fact, Athens kept up in admirable discipline a great fleet and a fine army; and P. made the Greek name more respected in his time than it had ever been before. It may be that his conduct is open to criticism in some respects, but a broad and just view of the motives which impelled him, and a fair consideration of the political exigences of the time, will, in the main, justify his procedure. It is unnecessary to give a detailed account of all that he did to make his native city the most glorious in the ancient world. Greek architecture and sculpture, under his patronage, reached perfection. To P., Athens owed the Parthenon, the Propylæa, the Odeum, and numberless other public and sacred edifices; he also liberally encouraged music and the drama; and, during his rule, industry and commerce flourished, and prosperity was universal in Attica. The age of P. was the golden age of Athens and of ancient Greece.

At length, B.C. 431, the long-foreseen and inevitable 'Peloponnesian war' broke out between Athens and Sparta. It terminated most disastrously for Athens, but P. is not blamable for the result: the policy which he recommended was not pursued. P. died after a lingering sickness.—For a notable episode in his life, see ASPASIA.

PERICLINE, n. *pĕr'ĭ-klīn* [Gr. *periclī'nēs*, a sloping or shelving all round—from *peri*, about; *klinō*, I bend]: a semi-opaque variety of albite in which a portion of the soda is replaced by potash. PER'ICLI'NAL, a. *-klī'năl*, dipping on all sides from a central point or apex—applied to strata which dip in this manner.

PERICLINIUM, n. *pĕr'ĭ-klĭn'ĭ-ŭm* [Gr. *peri*, around; *klinē*, a bed]: in *bot.*, the involucre of Compositæ.

PERICOPE, n. *pĕ-rĭk'ō-pē* [LL., from Gr. *perikope*, from *peri*, around, and *kopto*, cut]: 1. A selection from a book; extract. 2. Eccl. An arrangement of selections from the Epistles and Gospels adapted to Lord's Days and festivals.

PERICRANIUM, n. *pĕr'ĭ-krā'nĭ-ŭm* [Gr. *peri*, around; *kranĭŏn*, the skull—from *kara*, the head]: the fibrous membrane that goes round or invests the skull, identical in structure and function with the periosteum.

PERIDERM, n. *pĕr'ĭ-dĕrm* [Gr. *peri*, about; *derma*, skin]: in *bot.*, the outer layer of bark.

PERIDIUM, n. *pĕ-rĭd'ĭ-ŭm*, PERID'IA, n. plu. *-ĭ-ă* [Gr. *perĭdĕō*, I wrap round—from *deō*, I bind]: in *bot.*, the coat immediately enveloping the sporules of the lower tribes of acotyledons; a covering, as of a puff-ball. PERIDIOLA, n. plu. *pĕr'ĭ-dī'ŏ-lă* [L. dim. of *peridium*]: a number of small peridia inclosed in a general covering.

PERIDOT, n. *pĕr′ĭ-dŏt* [F. *péridot*, peridot: Ar. *feridet*, a precious stone]: jewellers' designation for the green transparent varieties of Olivine. It is included with Olivine under the general term Chrysolite (q.v.), which, however, is more specifically applied to the stone when yellow or yellowish-green. P. is the softest of gem-stones, little harder than glass. It is supposed to be the topaz of the ancients.

PERIECIANS: see PERIŒCI.

PÉRIER, *pā-re-ā′*, CASIMIR: French statesman: 1777 Oct. 21—1832, May 16; b. Grenoble, dept. of Isère. Casimir, who was still at the college at Lyon when the Revolution broke out, went to Paris, and with his father and elder brother founded a banking company, which became the Bank of France. P. served in the army 1798–1801; then returned to his banking business in Paris; and sat in the chamber of deputies (about 1817–30). 1831, Mar. 31, he succeeded Lafitte as minister, serving till his death by cholera.—P. prospered greatly in his financial business; and in his official service he was sagacious, sincere, and patriotic. In principle he was a constitutionalist; moderating so far as possible the extreme zeal of all parties, but steadily laboring at home and abroad to extend constitutional liberty. He originated the political system known as the *Juste Milieu* (q.v.). His foreign policy was remarkably successful. He was a favorite with the people of Paris, and exerted upon them a great influence.

PERIGASTRIC, a. *pĕr′ĭ-găs′trĭk* [Gr. *peri*, around; *gastēr*, stomach]: applied to the cavity which surrounds the stomach and other viscera, corresponding to the abdominal cavity of the higher animals.

PERIGEE, n. *pĕr′ĭ-jē*, or PER′IGE′UM, n. *-jē′ŭm* [F. *périgée*—from Gr. *perigei′os*—from *peri*, about; *gē*, the earth: It. *perigeo*, the perigee]: that point in the orbit of the moon, or of a planet, which is nearest to the earth; opposed to *apogee* (see MOON). PER′IGE′AN, a. *-jē′ăn*, pertaining to the perigee.

PERIGONE, n. *pĕr′ĭ-gōn* [Gr. *peri*, around; *gonē*, seed]: in *bot.*, a term applied to floral envelopes; a synonym for *perianth*, especially when reduced to a single floral whorl. PER′IGO′NIUM, n. *-gō′nĭ-ŭm*, a barren flower in mosses, having involucral scales.

PERIGORD, n. *pĕr′ĭ-gŏrd* [from *Perigord*, in France]: mineral of a dark-gray color, an ore of manganese. PERIGORD-PIE, a pie made with truffles, esteemed by epicures. It is called also *Pâté de Périgueux* (see PÉRIGUEUX).

PÉRIGORD, *pā-re-gor′*: old prov. of s.w. France, forming part of the military govt. of Gascony and Guienne, and now included in Dordogne and Lot-et-Garonne. It became a co. in the 8th c., and was united to the crown by Henry IV. It was divided into Upper and Lower P.: Périgueux and Sarlat were the capitals.

PERIGRAPH, n. *pĕr′ĭ-grăf* [Gr. *peri*, around; *graphē*, a writing]: a careless or inaccurate delineation of anything; in *anat.*, the white lines or impressions that appear on the musculus rectus of the abdomen.

PÉRIGUEUX, *pā-rē-gĕ̄′*: town of France, cap. of the dept. of Dordogne; on the right bank of the Isle; 79 m. by rail e.n.e. of Bordeaux, 310 m. s.s.w. of Paris. Pop. (1901) 31,976. It consists of the ancient city of P. proper—gloomy in aspect, and with narrow streets but large and solidly built houses; and the *Puy St. Front*, which until 1240 was a separate and rival town. In the old town are many curious remains of Gothic architecture. The old ramparts have been demolished, and replaced by beautiful and spacious boulevards. The cathedral of St. Front is a majestic edifice, built 984–1047; unfortunately 'restored' 1865, with large loss of its antique features. It resembles St. Mark's at Venice, and the Byzantine churches. Its pointed arches were widely imitated in Aquitania, and prepared the way for the Gothic style. Quarries of building stone are worked in the vicinity, and many hands are employed in cutting and polishing marble. Paper, woolen cloths, cutlery, and hosiery are manufactured. The celebrated *Pâtés de Périgueux*, made of partridges and truffles, are largely made and exported.

P. is a town of the highest antiquity, the *Vesunna* mentioned by Cæsar. In ancient times, it was a city of much importance. It stood at the junction of five Roman roads, and contained a number of splendid edifices. Close to the modern town are still seen the remains of a vast amphitheatre, dating prob. from the 3d, possibly the 2d, c.; oval in form, and larger than the ancient amphitheatre of Nîmes: its diameter was 1,312 ft., and it could hold 40,000 spectators. There are also remains of ancient aqueducts, baths, and temples. The *Tour de Vésonne* is the most remarkable fragment of Roman architecture. It is still 89 ft. high, diameter 68 ft., and appears to have been much higher; is about 200 ft. in circumference, and has walls 6 ft. thick. It has neither doors nor windows. Its purpose is not known, but it is believed to have been the main part of a heathen temple.

PERIGYNIUM, n. *pĕr′ĭ-jĭn′ĭ-ŭm* [Gr. *peri*, around; *gunē*, a woman]: applied to the covering of the pistil in the genus Carex; the membranous covering of the pistil of sedges. PERIGYNOUS, a. *pĕ-rĭj′ĭ-nŭs*, growing on some part that surrounds the ovary in a flower—applied to the corolla and stamens when attached to the calyx.

PERIHELION, n. *pĕr′ĭ-hē′lĭ-ŏn*, or PER′IHE′LIUM, n. *-lĭ-ŭm* [Gr. *peri*, about; *hēlĭŏs*, the sun: F. *périhélie*]: the point in the orbit of a planet or a comet nearest the sun —the point farthest away from the sun is called *Aphelion* (q.v.). The position of the P., i.e., its long. e. or w. of the equinox, is one of the seven elements of a planet's orbit.

PERIL, n. *pĕr′ĭl* [F. *péril*—from L. *peric′ŭlum*, danger; It. *periglio, pericolo*]: hazard; danger; jeopardy; particular exposure to injury: v. to hazard; to expose to danger. PER′ILLING, or PER′ILING, imp. PER′ILLED, or PER′ILED, pp. *-ĭld*. PER′ILOUS, a. *-ĭl-ŭs*, dangerous; full of peril; in *OE.*, smart; witty: see also PARLOUS. PER′ILOUSLY, ad. *-lĭ*. PER′ILOUSNESS, n. *-nĕs*, quality of being perilous; danger; hazard.—SYN. of 'peril, n.'; risk; venture.

PERILYMPH, n. *pĕr′-lĭmf* [Gr. *peri*, around; L. *lympha*, water]: the fluid secreted by the serous membrane which lines the osseous labyrinth of the ear.

PERIM, *pā-rēm′*: small island belonging to Great Britain, in the strait of Bab-el-Mandeb, at the entrance to the Red Sea; lat. 12° 40′ 30″ n. long. 43° 23′ e. Perim is 1½ m. from the Arabian, and 9 m. from the African, coast: it is level, slightly above the sea; 3½ m. long. On both sides of this island the navigation is easy; the Little Strait, between the island and Arabia, is the passage usual for vessels. The island is bare, destitute of fresh water, and ill-furnished with provisions, which are brought mostly from Aden. Perim owes its importance wholly to its commanding position at the entrance of the Red Sea. On its s.w. side is an excellent harbor, capable of accommodating 40 men-of-war, within 100 yards of the shore. There is a walled light-house on the island. Fortifications were erected on the island 1857, but, with the temporary arsenal, etc., were subsequently removed. It was captured by Sir David Baird, and then occupied by the English 1799, and held by them as a check upon the designs of the French, then in Egypt. It was abondoned 1801, but was reoccupied by Great Britain 1857, for protection of her Indian possessions, thought to be exposed to some danger from the opening of the Suez Canal (q.v.). Pop. 149.

PERIMETER (in Psychology), *pĕr-ĭm′ĕ-tĕr* [Gr. *περί*, around; +*μέτρου*, measure]: an instrument designed to determine size and form of the visual field; to determine also the limits of sensitivity to different colors; whether with retina adapted to light or to darkness. The light adapted retina, for example, can be shown by the use of the perimeter to see red only with the central portions, whereas blue can be seen by the more peripheral portions.

PERIMETRICAL, a. *pĕr′ĭ-mĕt′rĭ-kăl*: pertaining to.

PERIMETRITIS, n. *pĕr′ĭ-mĕt-rī′tĭs* [Gr. *peri*, round about; *mētra*, the womb—from *mētēr*, a mother: the inflammation of the peritoneal covering of the uterus, usually involving neighboring parts.

PERIMYSIUM, n. *pĕr′ĭ-mī′zĭ-ŭm* [Gr. *peri*, round about; *mus*, a muscle]: an outward investment or sheath of areolar tissue which surrounds an entire muscle and sends partitions inward between the fasciculi, furnishing to each of them a special sheath.

PERINÆUM, n. *pĕr′ĭ-nē′ŭm* [Gr. *perinai′on*, the part between the anus and the scrotum—from *peri*, round about; *naiō*, I inhabit]: region of the lower part of the body, having the anus at its centre, bounded in front by the genitals and at the sides by the inner surfaces of the thighs. The part of the human body which forms the floor of the true pelvis is by anatomists divided into two portions. Of these, the anterior one, in front of the anus, is called the *true perinœus*, or urethral portion of the Perinæum; the posterior portion, which contains the anus or termination of the rectum, is called the ischio-rectal region, or anal portion of the perinæum. The anterior portion, or true perinæum, is triangular in form, the apex being in front; the sides, about three inches in length, are formed by the rami of the pubes and ischium; and the base by an imaginary line joining the tuberosities of the ischium, and passing about half an inch in front of the anus. Through this space the urethra passes through a layer of strong fascia—the deep perinæal fascia—to communicate with the bladder; and in this space the opening is made in the operation of lithotomy. PERINÆAL, a. *pĕr′ĭ-nē′ăl*, of or pertaining to the perinæum.

PERINEURIUM, n. *pĕr′ĭ-nū′rĭ-ŭm* [Gr. *peri*, round about; *neuron*, a nerve]: the coarser sheathing of the nerves and nervous cords—the fine sheath of each fibre being termed 'neurilemma.'

PERIOD, n. *pē′rĭ-ŏd* [F. *période*—from L. *perĭŏdus*, a complete sentence, a period—from Gr. *peri′ŏdos*, a circuit, a passage round—from *peri*, around; *hodos*, a way: It. *periodo*]: stated number of years; a round of time, at the end of which a thing may return to a former state (see PERIOD, in Chronology): specified portion of time: state at which anything terminates: time occupied by the revolution of a heavenly body; end; conclusion; a complete sentence; the point (.) indicating the end of a sentence; a series of numbers recurring, or pointed off by a dot or comma; a cycle of an alternating or pulsating current (See *Electro-Dynamics*). PERIODIC, a. *pē′rĭ-ŏd′ĭk*, or PE′RIOD′ICAL, a. *-ŏd′ĭ-kăl*, making a circuit; returning; appearing regularly or happening at certain stated times. PE′RIOD′ICAL, n. *a publication which* appears in numbers at stated intervals of time (see PERIODICALS). PE′RIOD′ICALLY, ad. *-lĭ*. PE′RIOD′ICALIST, n. *-ĭst*, one who publishes a periodical. PE′RIODIC′ITY, n. *-ŏd-ĭs′ĭ-tĭ*, state of having regular periods, or stated intervals, in changes or conditions (see *Electro-Dynamics*).—SYN. of 'period': date; time; era; epoch; age; generation; duration; bound; limit; determination; stop.

PE′RIOD, in Chronology: term used in the same sense as Cycle (q.v.), to denote an interval of time after which the astronomical phenomena to which it refers recur in the same order. It is used to denote also a

cycle of cycles. Various periods have been invented by astronomers; the following are a few of the most important:

The Chaldæans invented the *Chaldæic Period*, or *Period of Eclipses*, from observing that after a certain number of revolutions of the moon round the earth, her eclipses recurred in the same order and of the same magnitude. This period consists of 223 lunations, or 6,798.28 days, and corresponds almost exactly to a complete revolution of the moon's node. The Egyptians made use of the *Dog-star, Siriacal*, or *Sothric Period*, as it is variously called, to compare their civil year of 365 days with the true or Julian year of 365¼ days. The period consequently consisted of 1,460 Julian years, corresponding to 1,461 Egyptian years, after the lapse of which the dates in both reckonings coincided. By comparing the solar and lunar years, Meton, an Athenian, invented B.C. 432 a lunar period of 6,940 days, called from him the *Metonic Cycle* (q.v.), also the *Lunar Cycle*. About a century afterward, the cycle of Meton was discovered to be an insufficient approximation to the truth; and as he had made the solar year too long by about $\frac{1}{76}$ of a day, at the end of 4 Metonic cycles the solar reckoning was found to be in advance of the lunar by about 1 day, 6 hours. To remedy this, a new period, the *Calippic Period*, was invented by Calippus, consisting of 4 Metonic cycles less by one day, or 27,759 days. But as this period still gave a difference of 6 hours between the solar and lunar reckonings, it was improved by Hipparchus, who invented the *Hipparchic Period* of 4 Calippic periods less by one day; or 111,035 days, or about 304 Julian years, which is an exceedingly close approximation, being only 6½ minutes too long, when measured by the tropical year; and too short, but by an almost inappreciable quantity, when measured by the *Synodic Month* (see MONTH). The *Period of the Heliacal* or *Solar Cycle*, after which the same day of the month falls on the same day of the week, consists of 28 Julian years. If the year had regularly consisted of 365 days, that is: one day more than an exact number of weeks, it is evident that, at the end of seven years, the days of the month and week would again correspond; but the introduction of an intercalary day into every fourth year causes this coincidence to recur at irregular periods of 6, 11, 6, and 5 years successively. However, by choosing a period such as will preserve the leap-years in the same relative position to the other years, and at the same time consist of an exact number of weeks (both of which objects are effected by using the number 28, which is the least common multiple of 4 and 7), we insure the *regular* recurrence of the coincidence between the days of the week and of the month. The solar cycle is supposed to have been invented about the time of the Council of Nice, A.D. 325, but it is arranged so that the first year of the first cycle corresponds to B.C. 9. In calculating the position

of any year in the solar cycle, care must be taken to allow for the omission of the intercalary day at the beginning of each century, and its insertion in the first year of every fourth century (see LEAP-YEAR). The year 1880 was the 13th of the solar cycle. The *Julian Period* is a cycle of cycles, and consists of 7,980 ($=28\times19\times15$) years, after the lapse of which the solar cycle, lunar cycle, and the Indiction (q.v.) commence together. The period of its commencement has been arranged so that it will expire at the same time as the other three periods from which it has been derived. The year B.C. 4713 is taken as the first year of the first period; consequently A.D. 1 was the 4714th of it, and 1890 was the 6,603d.—See CHRONOLOGY; CYCLE; CALENDAR; YEAR; MONTH; DAY; ERA; DATE; etc.

PERIOD, in geologic chronology: a time interval the value of which has been variously interpreted. The special committe of the International Congress of Geologists at the Bologna meeting in 1881 recommended the use of the term period for the time division of second magnitude, that for the first being *era*. The rocks formed during this time period were to be grouped as a system. According to this usage we should have Cambric, Ordoviciv, Siluric, Devonic, etc., periods. In this sense the term is used by the United States Geological Survey. Dana on the other hand uses *era* for this time division, giving *period* a subordinate rank—as Niagara period, Onondaga period, Lower Helderberg period. The New York state survey uses the term in nearly this sense but emphasizes more especially the threefold division of each era, that is, early, middle, and later Devonic periods, or early, middle, and later Cambric periods. The dual nomenclature of geologic classification, that is, the separate grouping of the time divisions and of the corresponding rock divisions was first strongly urged in this country by Prof. Henry S. Williams of Cornell (late of Yale). He also proposed the use of the prefixes *eo, meso,* and *neo* for the periods. Thus he uses *Eosilurie, Mesosiluric* and *Neosiluric* periods. The New York state survey has adopted these terms with the substitution of *palæo* for *eo*. Consult Williams, *The Making of the Geological Time S. Cal.* (*Journ. of Geol.* I., 180–197); *Dual Nomenclature in Geological Classification* (*ibid.*, II., 145–160); *Geologic Biology* (1895); Clarke and Schuchert, *The Nomenclature of the New York Series of Geologic Formations* (*Science,* Dec. 8, 1899), and *American Geologist* (February 1900). See AGE; CENOZOIC; ERA; FORMATION; MESOZOIC; PALEOZOIC, QUATERNARY; SECONDARY; SERIES; SYSTEM; TERTIARY.

PERIODIC ACID, *pĕr'ĭ-ŏd'ĭk* [Eng. *iodine*]: an acid analogous to perchloric acid, and composed of one equivalent of iodine with seven of oxygen.

PERIOD'ICALS. In the general acceptance of the

term a periodical is any publication other than a book or daily newspaper. Usually the term comprises those serial publications the principal object of which is the circulation of interesting essays, tales, poems, and useful information of a literary, scientific, or artistic character. Periodicals are, furthermore, generally distinguished from newspapers by the greater care and reflection commonly bestowed upon their articles, and by their shape, which is always such that the numbers may be easily and conveniently bound and preserved in the form of books. Periodical literature embraces two classes of publications, the first devoted to literature or criticism, and the second to the sciences, the arts, or to special branches of knowledge. Periodicals exclusively devoted to criticism are generally called reviews, and those whose contents are of a miscellaneous and entertaining kind, magazines; but there is no great strictness in the use of the terms. The spread of knowledge during the 18th and 19th centuries, and the multiplication of books rendered it impossible for the scholar to inform himself of the progress of learning in various countries, or to purchase and read more than a small portion of the works published; hence the necessity for critical serials, magazines and other productions in the field of periodical literature. In the United States and in Great Britain most periodicals are issued either weekly or monthly. In France, Italy, and Belgium the fortnightly is regarded as the natural form of the high-class periodical. Outside these countries the fortnightly is practically unknown. In Russia, Germany, Scandinavia, and in Spain and Portugal the periodicals are monthly. The periodical had its genesis in France in 1665, and Italy and Great Britain followed soon afterward. But rather than deal with the subject chronologically, it would seem better for the sake of convenience to tell the life history of the periodical by an alphabetical arrangement of countries.

Australia.—The British periodical, circulating largely in Australia, curtails to a great extent the native product. In Melbourne is published the *Imperial Review*, issued quarterly, and there is a similar periodical in Sydney. The *Monthly Review* is published in New Zealand. There are several religious magazines, illustrated weeklies and sporting journals issued in Melbourne and Sydney.

Belgium.—From 1772 to 1818, the *Esprit des Journaux*, a literary miscellany of considerable value, was published in Belgium, but it was not until the separation from Holland that a distinctive periodical literature appeared. In the early years of the 19th century the *Messages des Sciences* was edited by Saint Genois, while the *Nederdeutsche Letteroeffningen* made its appearance in 1836. The well-known scholar, Willems, edited the *Belgisch Museum* from 1836 to 1846. Among

other publications were the *Kunst- en Letterblad* and the *Vlaemsche Rederyker* and several miscellanies.

Denmark.—The first literary journal in Denmark was the *Loerde Tidende* published from 1749 to 1766. The *Minerva* appeared from 1785 to 1819, followed by the *Danske Tilskuer*, the *Skandinavisk Museum* and the *Loerde Efterretninger*. In 1836 the *Athene* was issued, and in 1840 the *Historisk Tidskript*. Other more modern periodicals were the *Universitets Tidskript*, the *Dansk Naanedskript*, the *Hjemme og Ude*, the *Nord og Syd*, and the *Litteratur Tidende*.

Canada.—Like Australia, Canada has been dependent upon the mother country, and has also looked to the United States for her periodical literature. A number of religious journals are published in Toronto and Montreal, and the *Canadian Magazine* has flourished for a dozen years. In 1880 a humorous weekly called *Grit* was published in Toronto. The *Bystander*, a unique magazine edited, written and owned by Goldwin Smith, and *Once-a-Week* were short-lived Toronto publications.

England.—With the possible exception of the *Philosophical Transactions of the Royal Society*, which first appeared in 1665, the earliest English periodical seems to have been the *Weekly Memorials for the Ingenious*, the first number of which is dated January 1681. It was followed by several other periodicals, the most noteworthy being the *History of the Works of the Learned* (1699–1711); the *Memoirs of Literature* (1709, continued under different titles till 1743). In the same century the nearest approach to the review, as differing from the magazine proper, was made by the *Monthly Review* (1749–1844), which was followed by the *Critical Review* (1756–1817), to which Smollett largely contributed; the *British Critic* (1793–1843); the *Anti-Jacobin Review and Magazine* (1798-1821). In 1809 appeared the *Quarterly Review*, successively edited by Gifford, Coleridge, and Lockhart, who were assisted by the contributions of Scott, Southey, Croker, Heber, etc., who wrote in the Tory interest. In 1824 the *Westminster Review* was started by Bentham as the organ of utilitarianism and radicalism in politics, and has numbered among its contributors Bowring, Grote, Carlyle, John Sterling, Mill, Bain, etc. To provide critical literature at shorter intervals there was started in 1865 the *Fortnightly Review*, which for a short time appeared twice a month, since then only once. It was followed by the *Contemporary Review* (1866) and the *Nineteenth Century* (1877—since 1901 the *Nineteenth Century and After*). Among the more recent periodicals of this class are the *National Review* (1883), a Conservative organ; the *Review of Reviews* (1890), giving analyses of the current periodicals generally; the *New Century Review* (1897); and the *Monthly Review* (1900). *The Athenæum* (1828) and the *Academy* (1869) are weekly journals devoted to the criticism of new books, paintings and

sculpture, music and dramatic works and performances, with information on matters connected with literature, science and art. The *Saturday Review*, *Spectator*, and *Speaker* (all weekly) combine the character of the review proper with more or less of that of the newspaper. The first English magazine, properly speaking, may be said to be the *Gentleman's Journal, or Monthly Miscellany*, commenced in 1692. The well-known *Tatler* (1709–10), *Spectator* (1711–12, revived 1714) and *Guardian*, as well as Johnson's *Rambler* (1750–51) were periodicals of a special kind. In 1731 appeared the *Gentleman's Magazine*, published by Cave, and contributed to by Johnson and other eminent writers. It brought a fortune to the lucky publisher, after whose death it was continued by Henry and Nichols. The success of Cave's venture brought out a host of imitators. The *London Magazine* (1732–84), the *European Magazine* (1782–1826) and the *Monthly Magazine* (1796–1829) were among the chief of this class which were originated in the 18th century. In 1832 *Chambers' Journal* made its appearance, marking the commencement of a new and more popular era. It was published weekly, but was also issued in monthly parts. *Cassell's Family Paper* (now known as *Cassell's Family Magazine*) was not started till 1853. The old *Penny Magazine* (1832), published by the Society for the diffusion of Useful Knowledge, deserves honorable mention. It was succeeded by the *Leisure Hour* in 1852, still one of the best illustrated sixpennies, published by the Religious Tract Society. Charles Dickens founded *Household Words* in 1850, and *All the Year Round* in 1859. A new era in this kind of literature was inaugurated by the shilling monthlies, some of them with excellent illustrations, the first being *Macmillan's Magazine* (1859); *Cornhill Magazine* (1860); *Temple Bar* (1860); closely followed by a number of others. Another step in the direction of cheapness was shortly afterward made by the publication of monthly magazines at sixpence, including *The Argosy*, *Good Words*, the *Sunday Magazine*, etc., followed at a long interval by *Longman's Magazine*, *Murray's Magazine*, *English Illustrated Magazine* (1883); *Ludgate* (1891); *Strand Magazine* (1891); *Idler* (1892); *Woman at Home* (1893); *Windsor* (1895); *Englishwoman* (1895); *Lady's Realm* (1896); *Pearson's Magazine* (1896); *Temple Magazine* (1896); *Girl's Realm* (1898); and *Wide World Magazine* (1898). Threepenny and fourpenny monthly magazines such as *The Young Man* (1887), *Young Woman* (1892), *Harmsworth Magazine* (1898) and *Royal Magazine* (1898) have become prominent in recent years. *Cosmopolis* (1896) has sections in French and German. There are innumerable religious magazines. The Roman Catholic Church is represented by the *Month*, the *Lamp*, the *Lyceum*, and *Saint Peter's* (1898). The Wesleyan Methodists and the Primitives publish quarterlies. The

Jewish Quarterly is read by many who are not Jews. The Salvation Army has a monthly in *All the World;* Mr. Spurgeon established *The Sword and Trowel;* the *Animal World* is the organ of the Society for the Prevention of Cruelty to Animals, and *The Child's Guardian* of the Society for the Prevention of Cruelty to Children. *The United Service Magazine* is a monthly, the *Navy and Army* a weekly. The *Badminton* is devoted to sport.

France.—In January, 1665, Denis de Sallo, assuming the name of the Sieur de Hédonville, issued at Paris the first number of the *Journal des Savants,* the first periodical in France if not in the world. J. Doneau de Vise founded in 1672 the second literary periodical in France, the *Mercure Galant,* which gave reviews of poetry and the drama. Its title was changed in 1717 to the *Mercure de France,* and it was conducted with ability by Marmontel and others until 1818. In 1701 a society of Jesuits at Trévoux began the *Memoires pour servir a l'Histoire des Sciences et des Beaux-Arts,* more commonly known as the *Mémoires de Trévoux.* It was characterized by the excellence of its critical judgments, and by the zeal with which it combated anti-Jesuitical opinions; it lasted until 1767. The other noteworthy literary journals of France in the 18th century were the *Année Littéraire* of Fréron (1754–91); the *Magasin Encyclopédique,* begun in 1795, the second series of which was called the *Annales Encyclopédiques,* and the third the *Revue Encyclopédique*—it was suspended in 1832, and a last attempt was made to re-establish it by Didot in 1846, but failed. In the 19th century the *Revue Française,* the *Revue de Paris,* the *Revue Indépendante* and many more have appeared and been discontinued. But the *Revue des Deux Mondes,* begun in 1829, and from 1831 issued fortnightly, was marked by an ability which rendered it permanent, and placed it in the front rank of the critical journals of the world. In 1852 appeared the *Revue Germanique,* devoted to German literature; the *Revue des Races Latines* (1857) appropriated to the arts and letters of those nations having a Latin origin; and of the *Revue Européenne* (1859). Other important French periodicals include the *Nouvelle Revue, Revue Politique et Littéraire, Grande Revue, Revue de Famille, Revue Illustrée, L'Illustration, Revue des Lettres et des Arts, Figaro,* etc. To the admission of poetry and tales into the reviews, and to the publication by almost every newspaper of a literary *feuilleton,* must be ascribed the almost total want in France of serials exactly corresponding to the English and American magazines.

Germany.—The first periodicals in the German language were written in the form of dialogues; they were the *Monatsgespräche* (1688–9) and the *Monatliche Unterredungen* (1689–98). Under the title of *Gelehrte Zeitung* almost every large town had at some period of

the 18th century its literary journal, such, for instance, as those published at Frankfort (1736–86), Halle (1766–92), Gotha (1774–1804), and others. But of more importance than all these was the *Göttinger Gelehrte Anzeigen*, begun in 1739. In 1766 Nicolai founded the *Allgemeine Deutsche Bibliothek*, which lived over 49 years; the more valuable *Briefe, die neueste Literatur Betreffend*, supported by Lessing, Mendelssohn, and others, had an existence of only six years (1759–65). Among the other notable periodicals established in the 18th century and in the beginning of the 19th were the *Allgemeine Literatur-Zeitung* (1785–1848); the *Jenaische Allgemeine Literatur-Zeitung* (1804–48); to which the great literary circle of Weimar, of which Goethe was the centre, contributed. The *Leipziger Literatur-Zeitung* (1800), the *Wiener Jahrbücher der Literatur* (1818), *Hermes* (1819), and the *Jahrbücher für Wissenschaftliche Critik* (1827). The leading existing critical authorities are the *Heidelberger Jahrbücher der Literatur* (1808), the *Deutsche Vierteljahrsschrift* (1838), modeled upon the English review, and the *Gelehrte Anzeigen*. Of a more popular tone are the *Blätter für Literarische Unterhaltung* (1833), the *Deutsches Museum* (1852), the *Grenzboten* (1841), *Westermanns Monatshefte* (1855), and many more of the magazine kind. The *Illustrirtes Familien-Journal* of Leipsic is of the Penny Magazine school, and enjoys a very large circulation. Of more recent date are *Die Gegenwart* (1872), the *Literaturzeitung* (1874), the *Deutsche Rundschau* (1874), *Die Neue Zeit* (1872). *Nord und Süd* (1878), *Die Nation* (1888), *Die Zukunft* (1892).

Holland.—In 1684 appeared the *Mercure Savant* at Amsterdam, and in the same year the *Nouvelles de la Republique des Lettres*, which was continued with great success until 1718. Then came the *Boekzal van Europa* (1692–1708), which was excelled by the *Republijk der Geleerden* (1710). J. van Effen produced his *Hollandsche Spectator* (1731) with marked success; but a new era in criticism was introduced in 1761 by the *Vaderlandsche Letteroefningen*. The *Allgemeene Konsten Letterbode* (1788) maintained for many years a high rank. The *Recensent* (1803) superseded by the *Nieuwe Recensent*, proved itself a powerful rival to the *Letteroefningen*. Other periodicals are the *Nederlandsche Museum* (1835), the *Tijdstrom* (1859) and the *Navorscher*.

India.—The best known of early periodicals in India were the *Calcutta Monthly Register* (1798); the *Oriental Magazine and Indian Hurkaru*, which began at Madras in 1819; the *Madras Miscellany;* the *Calcutta Review* (1844); a valuable existing quarterly; and the *Bombay Quarterly Review*, which dated from 1855. At Singapore the *Journal of the Indian Archipelago*, began

in 1847, while the *Chinese Repository*, begun by Morrison at Canton, was from 1832 to 1851 filled with valuable articles relating chiefly to literature and history. To-day India has the *Calcutta Review* (quarterly) and the monthlies, the *National Magazine*, the *Indian Magazine and Review* and *Allahabad Review*.

Ireland.—The *Literary Journal* was published in Dublin in 1744, the first periodical in Ireland. In 1836 the *Dublin Review* was established by O'Connell and his friends as the organ of the Roman Catholic party. The *New Ireland Review* appeared in 1894. There are many lesser periodicals in Cork and Dublin.

Italy.—In 1668, the *Giornale de letterati* was commenced at Rome by Nazzari, and published until 1679. Under the same title literary periodicals were afterward issued at Parma (1686), at Venice (1719), at Florence (1742), and finally at Pisa in 1771. The *Biblioteca volante* (1676) was of a less solid character, but the *Novelle letterarie*, published for several years subsequent to 1740, was marked by much erudition. Distinguished at a later period were the *Biblioteca Italiana* (1816) of Milan; the *Antologia* (1821) of Florence; the *Giornale Arcadico* (1819) of Rome; the *Giornale Enciclopedico* (1806) of Naples, which was followed in that city by the *Progresso delle Scienze* (1833), the *Museo di Scienze e Letteratura*, and several minor ones, like the *Poligrafo* (1811), and *Magazzino Pittoresco*, and the popular *Album* (1824) of Rome. The chief critical serials are the *Rivista Contemporanea* (1852) of Turin, the *Politecnico* (1839) of Milan, which was suppressed in 1844, and revived in 1859; the *Giornali degli Eruditi* (1883); the *Nuova Revista Internazionale* (1879) and the *Revista Internazionale* (1883). There are 332 monthlies in Italy, of which 300 are read by no one outside Italy, and probably fewer than 300 subscribers within the peninsula.

Russia.—In point of size the Russian periodicals excel all others. Among the early publications were the *Yezhemyesyatchniya Sotchineniya* (Monthly Essays), edited by Muller from 1755 to 1764. Soon afterward commenced Sumarokoff's *Industrious Bee* (1759) and Keraskoff's *Leisure Hours* (1762). Superior to these, however, was the *Vyestnik Europi* (European Intelligence), founded in 1802 by the historian, Karamsin, and subsequently (1808) edited by Zhukovsky. To this succeeded the *Ruskoy Vyestnik*, conducted from 1808 to 1820 by Glinka, Gretch, and Polevoy, and which, after having been suspended for some years, was revived at Moscow in 1856 by Katkoff. One of the ablest publications was the *Sin otetchestva* (Son of the Fatherland), founded in 1812, with which was united in 1825 the *Severnoy Arkhiv* (1822) or *Northern Archives*. Among later day periodicals in Russia is the *Pantobiblon*, a magazine published in Saint Petersburg in no fewer than

15 different languages. It aims at providing professional and scientific men of all countries with a guide to the periodical literature, technical and scientific of the world.

Scotland.—The Scots *Magazine* first appeared in 1739 and the *Edinburgh Review* in 1802. In 1817 William Blackwood began the famous *Blaekwood's Edinburgh Magazine,* which soon distanced all its predecessors and took rank as the first serial of the kind in Great Britain. It was contributed to by Wilson (Christopher North), James Hogg, Lockhart, Wordsworth, Coleridge, Lamb, Maginn, De Quincy, Landor, and a host of other great literary names of a former generation; while in more recent times the productions of Professor Aytoun, Jerrold, Lord Lytton, George Eliot, etc., have enriched its pages. In 1830 came *Fraser's*—a magazine which, after many vicissitudes under many editors, is now extinct, while *Blaekwood's* still flourishes.

Spain and Portugal.—Spain has been represented in periodical literature by the *Diario de los literatos* (1737), the *Pensador* (1762), the *Seminario erudito* (1755), the *Memorial literario* (1784–1807), and the *Variedades,* which acquired a considerable reputation. The *Cronica eientifiea y literaris* (1834) subsequently became a political sheet. The *Censor* (1820) was for some years the best periodical which Spain had seen; this was finally superseded by the *Revista Española* (1831), which successively changed its title to *Revista Europea* and *Revista de Madrid.* Later were the *Cartas Españolas* (1831), the *Antologia Españolas* (1848), the *Revista de Espana,* the *Seminario pintoreseo* and the *Revista de ambos mundos.* The *Journal da Coimbra* in the early part of the 19th century was the first and for a long time the only literary organ of which Portugal could boast. In 1837, however, the *Panorama* was founded, and in 1842 the *Revista universal Lisbonense* was established. Other publications of the literary class are the *Journal da sociedade dos amigos das letteras* and the *Bibliophilo.*

Sweden.—The *Svenska Argus* (1732) was the earliest notable addition made by Sweden to learned periodical literature. In 1742 Celsius founded the *Tidningar om den lardes Arbeten;* but the first comprehensive critical journal was the *Svenska Mereurius* (1755), the *Phosphorus* (1810), and the *Iduna* (1811). Both wielded a powerful influence in the literary circles of Sweden, and originated two different schools of poetry and criticism. Among other periodicals were *Polyfem* (1810), *Svea* (1818), *Journal for Literaturen* (1809), *Skandia* (1833), *Literatur-Foreningens Tiding* (1833), and the *Literaturblad* (1838). The best of a later date are the *Tidskrift for Literatur* and the *Nordisk Tidskrift.*

Switzerland.—In Switzerland the *Bibliothèque Britannique* (1796-1815) and its successor, the *Bibliothèque*

Universelle (1816), which was published in two parallel series, one scientific and the other literary, were widely circulated both at home and abroad. The *Revue Suisse* has been conducted with much success at Neuchâtel since 1837.

United States.—American periodical literature dates from 1741, when Franklin issued the *General Magazine and Historical Chronicle* at Philadelphia; but it existed only half a year, while the *American Magazine*, begun in the same year, by Webbe, was still less successful. The other issues of the kind prior to the Revolution were the *American Magazine and Historical Chronicle* (Boston, 1743–6), the *Boston Weekly Museum* (1743), the *Independent Reflector* (New York, 1752–4), the *New England Magazine* (Boston, 1758), which ceased after the appearance of a few parts; the *American Magazine* (Philadelphia, 1757–8), the *North American Magazine* (Woodbridge, N. J., 1758), the *American Magazine* (Philadelphia, 1769), the *Royal American Magazine* (Boston, 1774), and the *Pennsylvania Magazine* (Philadelphia, 1775). Before the end of the century came the *Columbian Magazine* (Philadelphia, 1786), the *American Museum* (1787), the *Massachusetts Magazine* (Boston, 1789), the *New York Magazine* (1790), the *Farmer's Museum* (Walpole, N. H., 1793), the *United States Magazine* (Philadelphia 1796); the *American Universal Magazine* (Philadelphia, 1797), and the *Monthly Magazine and American Review* (New York, 1799–1800), founded by the novelist Brown, but carried on afterward as the *American Review and Literary Journal* (1801). Early in the 19th century came the *Port Folio* (Philadelphia, 1801), the *New York Weekly Museum* (1814), *Graham's Magazine* (1840–50), *New York Mirror, Southern Literary Gazette, Gentlemen's Magazine, The Dial, Putnam's Monthly, The Galaxy, Littell's Living Age, Harper's Magazine,* and the *Eclectic.* Then came the *Atlantic Monthly* (Boston, 1857), edited by J. R. Lowell, supported by original contributions from some of the foremost American and English novelists, essayists, and poets. The review literature of the United States begins with the *American Review of History and Politics* (Philadelphia, 1811), but the ablest and most prominent publication of this sort has been the *North American Review* (1815), which has constantly maintained a high character both for the style and critical ability. Still later appeared *Lippincott's Monthly Magazine* (1868); *Scribner's Magazine* (1887); the *Century Magazine* (1881); *Arena* (1889); *Cosmopolitan* (1887); *Forum* (1886); *McClure's Magazine* (1893); *New England Magazine* (1886); *Overland Monthly* (1868); *Munsey's, Everybody's, Metropolitan, Review of Reviews, Collier's Weekly, Harper's Weekly, Leslie's Weekly, The Outlook, Independent, Saint Nicholas, Youth's Companion, Country Life in America,*

Woman's Home Companion, The Black Cat, World's Work, Ladies' Home Journal, Saturday Evening Post, The Circle, Judge, Puck, Life, Argosy, Broadway Magazine, Ainslee's, Burr McIntosh's, Cassell's, Cassier's, Success, Gunter's, McCall's, Ladies' World, Pearson's, Short Stories, Smart Set, Strand, Wide World, Scrap Book, The World To-day, the *Journal of American History* (1907) and a host of others of this character.

The more technical or specialist magazines include the *Yale Review, Bookman,* the *Reader, Literary World,* the *Critic,* the *Lamp, Book News, Booklovers', Literary Digest, South Atlantic Quarterly, Current Literature, Homiletic Review, National Geographic,* the *Metaphysical Magazine, Scientific American, Political Science Quarterly, Psychological Review, Quarterly Journal of Economics,* the *Astrophysical Journal, Technical World, Popular Science Monthly, Philosophical Review, Sewanee Review,* the *American Catholic Quarterly Review, Christian Herald,* the *Churchman,* the *Examiner, Freeman's Journal and Catholic Register,* the *Messenger* (New York), the *Catholic World, Christian Endeavor World* (Boston), the *Christian Advocate,* the *Detroit Churchman, American Homes and Gardens, American Economist, Army and Navy Journal, Four Track News, American Federationist, International Socialist Review, Wilshire's Magazine, Forest and Stream, Rider and Driver, Field and Stream, Outdoors Magazine,* the *Rudder,* the *Pictorial Review,* the *Delineator, New Idea, Woman's Magazine,* the *Designer,* the *Musical Age, Power,* the *Engineering Magazine, Iron Age, Cement Age, Manufacturers' Record* (Baltimore), *American Machinist,* the *Automobile, American Industries, Hardware, American Exporter, Dry Goods Economist, Printers' Ink, American Banker, American Grocer, Insurance Press, Insurance Monitor, Street Railway Journal, Railway Age Gazette* (prior to 1908 two magazines—*The Railway Age* and *The Railway Gazette*), *American Wine Press, Electrical Review, Engineering News, Architectural Record, Electrical World, Shoe and Leather Reporter, Engineering and Mining Journal, Medical News, Medical Record, Osteopathic World,* and many others. According to Powell's *Newspaper Directory* for 1907 there were 16,252 weekly, 2,876 monthly, 290 semi-monthly, 602 semi-weekly, 218 quarterly, 52 bi-weekly, 70 bi-monthly, and 56 tri-weekly publications in the United States. Nearly every religious, fraternal, economic, educational, historical, technical, scientific, social and industrial body has one or more periodicals devoted to its interests, and it is therefore impossible to even name all of the most prominent representative periodicals of each class as there are about 1,500 of them devoted to the trade and technical interests alone.

For a complete list of periodicals in the United States and Canada consult Poole, *Index to Periodical Litera-*

ture; Wilson, *Guide to the Periodicals;* Ayer's *Newspaper Annual* (Philadelphia), Powell, *Newspapers Worth Counting* (pub. by *Printers' Ink*, New York, 1906); and for Great Britain, Stead, *Index to Periodicals.* See EDUCATIONAL JOURNALISM.

PERIODIC'ITY, in Physiology and Pathology: tendency manifested by various phenomena in living animals to recur, after equal or nearly equal intervals of time. The alternation of sleep and waking, the phenomena of menstruation, and the punctual return of hunger, are some obvious instances of periodicity in the healthy subject; while less obvious examples are afforded by the apparently regular variations that have been observed in the excretion of carbonic acid from the lungs, and in the number of the pulsations of the heart at different periods of the 24 hours. As is well known by experience, periodicity may be usefully cultivated and fixed in daily habits. This is exemplified in the case of sleep, and in special degree by the daily relieving of the bowels at a particular hour, a habit in which it is important that all young persons should be carefully instructed, with a view to health and convenience (see PERISTALTIC MOTION).

In certain forms of disease, the law of periodicity or intermission is distinctly seen. The periodic recurrence of the paroxysms of intermittent fever is universally known: it is due to the invasion of the blood by new generations of the plasmodium.

PERIODONTAL, a. *pĕr'ĭ-ō-dŏnt'ăl* [Gr. *peri*, round about; *odous* or *odon'ta*, a tooth]: applied to the lining membrane of a tooth-socket. PERIODONTITIS, n. *pĕr'ĭ-ō-dŏn-tī'tĭs*, the inflammation of the lining membrane of a tooth-socket.

PERIŒCI, n. plu. *pĕr'ĭ-ē'sī*, or PER'IŒ'CIANS, n. plu. *-ē'shĭ-ănz* [Gr. *perĭoi'kos*, a dweller around—from *peri*, around; *oikĕō*, I dwell]: inhabitants of the earth living in the same latitudes, but in longitudes differing by 180 degrees, so that when it is noon with the one it is midnight with the other.—*Periœci* was also the name given, in anc. Greece, to the original Achaian inhabitants of Laconia by their Dorian conquerors. The Periœci were not slaves, like the Helots (q.v.); they were merely a vassal population, personally free, cultivating their own ground, and carrying on most of the home and foreign trade of Laconia, but possessing no political rights, and incapable of intermarrying with the Dorians. The Periœci must have been very numerous, for they occupied at one time more than 100 cities, several of which were on the coast, whence the whole seaboard of Laconia bore the name of the *Perioikis;* and they produced capital sailors, which doubtless accounts for the anomalous fact of Periœci being occasionally invested with the command of the Spartan fleet. They also

formed a part of the Spartan army. At the battle of Platæa, B.C. 479, there were 10,000 Periœci present.

PERIOSTEUM, n. *pĕr'ĭ-ŏs'tēŭm* [Gr. *perĭŏs'tĕon*—from *peri*, around; *ostĕŏn*, a bone]: the fibrous membrane immediately covering the bone. PER'IOS'TEAL, a. *-ăl*, relating to or connected with the periosteum.

PERIOS'TEUM: tough fibrous membrane which surrounds the various bones. It is highly vascular, and is the means by which the outer layers of the shafts and the greater part of the spongy portions of the bones are supplied with blood. From the internal surface of the periosteum also is produced a layer of soft blastema (or plastic fluid in which cells are developed), by means of which additions are made to the exterior of the growing bones. The process of ossification going on in the inner part of this blastema contributes to the thickness of the bone, while a fresh supply is continually being added to the exterior of the blastema, through the medium of the vessels of the periosteum. In young bones, this membrane is thick, and, in consequence of the intervening blastema, is very easily detached from the bone; but in the bones of the adult it is less thick and vascular, while its connection with the bone becomes closer, in consequence of the blastema being less; while in aged persons it is very thin, its vessels are scanty, and there is no blastema. Numerous experiments show that the formation of bone is essentially due to the action of this membrane; and that, by transplanting detached portions of periosteum into muscular or other tissues, bony tissue is generated in those parts. In most cases in which this membrane has become detached in consequence of a wound or of disease, the exposed bone (except in the instance of the skull, which derives most of its nutrient matter from the dura-mater) perishes; but this is not invariably the case. Among its other offices, it serves, by isolating the bone from the surrounding tissues, to prevent the spread of disease from them to it. The shin-bone or tibia is thus indebted to the periosteum for its ordinary immunity in cases of ulcer in that region.

PERIOSTI'TIS: inflammation of the membrane covering the bone; occurring generally on the surface of thinly covered bones, such as the tibia, clavicles, and cranial bones. Its chief causes are (1) a *syphilitic taint*, in which oval swellings, called *Nodes* are produced; (2) *rheumatism;* and (3) *tuberculosis.* In the two latter cases, there is a periosteal swelling around the whole circumference or surface of the bone. The affection, especially when due to the first or second of the above causes, is usually accompanied with considerable nocturnal pain. The disease in acute form is treated with leeches, fomentations, and the other ordinary antiphlogistic remedies. The nocturnal pains are best relieved by doses (five to ten grains) of iodide of potassium three times a day on an empty stomach.

PERIOSTRACUM, n. *pĕr'ĭ-ŏs'trā-kŭm* [Gr. *peri*, round about; *os'trăkon*, a shell]: in *zool.*, the layer of epidermis which covers the shell in most of the mollusca.

PERIPATETIC, n. *pĕr'ĭ-pă-tĕt'ĭk* [Gr. *perĭpatēt'ĭkos*, a walker about, belonging to the Peripatetics—from *peri*, around; *patĕō*, I tread or walk]: follower or disciple of Aristotle, either because he walked about as he taught or disputed in the Lyceum in Athens, or because he delivered his lectures in a shaded walk: a great walker: *ironically*, an itinerant teacher or preacher: ADJ. also PER'IPATET'ICAL, a. *-tĕt'ĭ-kăl*, walking about, as Aristotle did while he taught: pertaining to Aristotle, his philosophy, or followers. PER'IPATET'ICISM, n. *-tĕt'ĭ-sĭzm*, philosophy of Aristotle.

PERIPATUS, n. *pĕr-ĭp'ă-tŭs* [Gr. *peripatos*, walking about]: a remarkable genus of worm-like creatures of terrestrial habits, connecting the annulose and articulate types (see ARTICULATA).

PERIPHERY, n. *pĕr-ĭf'ĕr-ĭ* [F. *périphérie*—from Gr. *periphĕrei'ă*, a circumference—from *peri*, around; *pherō*, I carry]: the circumference of a circle, ellipsis, or other regular curvilineal figure. PERIPHERIC, a. *pĕr'ĭ-fĕr'ĭk*, or PER'IPHER'ICAL, a. *-ĭ-kăl*, pertaining to a periphery, or constituting one; in *bot.*, *peripherical* is applied to an embryo curved so as to surround the albumen, following the inner part of the covering of the seed. PERIPHERAL, a. *pĕr-ĭf'ĕr-ăl*, pertaining to a periphery.

PERIPHRASIS, n. *pĕr-ĭf'ră-sĭs*, or PERIPHRASE, n. *pĕr'ĭ-frāz* [Gr. and L. *periphrăsis*, circumlocution—from Gr. *peri*, about; *phrasis*, a speech—from *phrazō*, I speak: F. *périphrase*]: the use of more words than is necessary to express an idea; circumlocution. PER'IPHRASE, v. to express the sense of one word by means of several. PER'IPHRASING, imp. PER'IPHRASED, pp. *-frāzd*. PERIPHRASTIC, a. *pĕr'ĭ-frăs'tĭk*, or PER'IPHRAS'TICAL, a. *-tĭ-kăl*, expressing the sense of fewer words by more; circumlocutory. PER'IPHRAS'TICALLY, ad. *-lĭ*.

PERIPLAST, n. *pĕr'ĭ-plăst* [Gr. *peri*, round about; *plastos*, molded—from *plassō*, I mold]: in *zool.*, the intercellular substance or matrix in which the organized structures of a tissue are embedded.

PERIPNEUMONIA, n. *pĕr'ĭp-nū-mō'nĭ-ă*, or PER'IPNEU'MONY, n. *-nū'mŏ-nĭ* [Gr. *peripneumo'nĭă*, inflammation of the lungs—from *peri*, about; *pneumōn*, a lung—*pneō*, I breathe]: inflammation of the membrane which invests the lungs, accompanied with general disturbance of the whole system; remarkably prevalent among horses in s. Africa, in a zone from 20° to 27° s. lat. It is very fatal; and to its prevalence and virulence, Dr. Livingstone is disposed to ascribe the fact that horses, though so abundant in n. Africa, were unknown in the south till introduced by Europeans; this invisible barrier being more insurmountable than mountain ranges, deserts, or rivers. The season during which P. prevails is from Dec. to Apr. Zebras, antelopes, and oxen are liable to

it; but no other quadruped suffers so much from it as the horse. The flesh of animals which die of P. is unwholesome, and produces a malignant carbuncle.

PERIPOLYGONAL, a. *pĕr′ĭ-pō-lĭg′ō-năl* [Gr. *peri*, around, and Eng. *polygonal*]: in *crystallography*, having a great number of sides or angles.

PERIPTERAL, a. *pĕr-ĭp′tĕr-ăl* [Gr. *peri*, around; *pteron*, a wing]: winged all round; surrounded by a single range of columns. PERIPTEROUS, a. *pĕr-ĭp′tĕr-ŭs*, feathered on all sides. PERIPTERY, n. *pĕr-ĭp′tĕr-ĭ*, or PERIPTER, n. *pĕr′ĭp-tĕr*, a temple or edifice surrounded by a wing or aisle formed of columns exterior to the building.

PERISARC, n. *pĕr′ĭ-sârk* [Gr. *peri*, round about; *sarx* or *sarka*, flesh]: a general term for the chitinous envelope secreted by many of the hydrozoa.

PERISCIAN, a. *pĕr-ĭsh′ĭ-ăn* [Gr. *peri*, around; *skĭa*, a shadow]: having the shadow moving all round in the course of the day. PERIS′CIANS, n. plu. *-ănz*, or PERISCII, n. plu. *pĕr-ĭsh′ĭ-ī*, a name given to the inhabitants of the arctic zones, whose shadows move round at certain times of the year, describing circles during the day.

PERISCOPE, n. *pĕr′ĭ-skōp* [Gr. *peri*, around; *skopĕō*, I view]: a view on all sides; a general view. PER′ISCOP′IC, a. *-skŏp′ĭk*, viewing on all sides—a term applied to spectacles with concavo-convex glasses, constructed to increase the distinctness of objects when viewed obliquely.

PERISH, v. *pĕr′ĭsh* [F. *périssant*, perishing—from *périr*, to perish: L. *perĕō*, I am destroyed, I perish]: to wither and decay; to lose life or vitality in any manner; to come to nothing; to be lost eternally; in *OE.* and *Scot.*, to destroy; to wither. PER′ISHING, imp.: ADJ. having a tendency to perish; losing life; passing away. PER′ISHED, pp. *-ĭsht:* ADJ. destroyed; dead. PER′ISHABLE, a. *-ă-bl*, subject to decay or destruction. PER′ISHABLY, ad. *-blĭ*. PER′ISHABLENESS, n. *-bl-nĕs*, liability to decay or destruction. PERISHABLE GOODS, goods which quickly decay or deteriorate, as fruit, fish, and the like. —SYN. of 'perish': to decay; decline; die; pass away; be lost.

PERISOME, n. *pĕr′ĭ-sōm* [Gr. *peri*, about; *sōma*, body]: the coriaceous or calcareous integument of the echinoderms.

PERISPERM, n. *pĕr′ĭ-spėrm* [Gr. *peri*, around; *sperma*, seed—from *speirō*, I sow]: the exterior albumen or nourishing matter stored up with the embryo in the seed.

PERISPHERIC, a. *pĕr′ĭ-sfĕr′ĭk* [Gr. *peri*, around; *sphaira*, a sphere]: having the form of a ball; globular.

PERISPORANGIUM, n. *pĕr′ĭ-spōr-ănj′ĭ-ŭm* [Gr. *peri*, round about; *spora*, seed; *anggos*, a vessel]: in *bot.*, the indusium of ferns when it surrounds the sori.

PERISPORE, n. *pĕr′ĭ-spōr* [Gr. *peri*, round about; *spora*, seed]: the membrane or case surrounding a spore: the mother-cell of spores in Algæ.

PERISSODACTYLA, n. plu. *pĕr-ĭs'sō-dăk'tĭl-ă* [Gr. *perissos*, redundant, unequal; *dak'tulos*, a finger or toe]: section of the order *Ungulata* (q.v.), including those hoofed quadrupeds which have an unequal number of toes, as distinguished from the *artiodactyla*.

PERISTALTIC, a. *pĕr'ĭ-stăl'tĭk* [Gr. *peristal'tĭkŏs*, drawing together all round—from *peri*, around; *stellō*, I send]: a term applied to the peculiar worm-like motion of the intestines by which their contents are gradually forced downward; spiral; worm-like. PER'ISTAL'TICALLY, ad. *-tĭ-kăl-lĭ*. PERISTALTIC MOTION, called also VERMICULAR (worm-like) motion, peculiar motion or action of muscular coat of the intestines, by which the substances contained within it are regularly moved onward. See ALIMENTARY CANAL. This action of the intestines is readily seen on opening an animal (e.g., dog, cat, or rabbit) immediately after it has been killed; in which circumstances, it is perhaps exaggerated, from the stimulating action of the cold air; also it may be shown in an abnormally active state, though not altered in character, by subjecting the exposed intestines to the influence of the electro-magnetic machine.

The peristaltic motion commences at the pyloric third of the stomach, whence successive waves of contraction and relaxation are propagated downward through the whole length of the intestinal canal. In examining a portion of intestine at the moment of its contraction, we perceive a dilatation above it as well as below it; the latter being produced by the protrusion into it of the contents of the now contracted portion of the intestine; the former by the relaxation of a previously contracted portion. The rapid succession of these contractions and relaxations gives to the movements of the intestines the appearance of the writhings of a worm, whence they are distinguished by the appellation *vermicular*. These movements can occasionally be observed during life in the human subject, indirectly in cases of extreme attenuation of the abdominal walls, and directly in wounds of the abdomen, and during certain surgical operations.

Numerous observations tend to show that this motion has a nearly definite velocity in each individual. Usually the act of defecation takes place with perfect regularity every 24 or (more rarely) every 12 hours, the quantity discharged being almost constant, if the mode of living does not vary.

That the influence of *expectant attention* on the muscular movements of the intestine (and especially of its lower portion) is very great, is shown in various ways. It is, for the most part, thus that *habit* operates in producing a readiness for defecation at one special hour in the day, and that bread-pills and other equally inert substances act on the bowels, if the patient believes them to be purgatives.

PERISTERITE, n. *pĕr-ĭs'tĕr-īt* [Gr. *peris'tĕră*, a

pigeon]: a variety of albite of a grayish-white color, exhibiting, when properly cut, a bluish opalescence like the changing hues on a pigeon's neck.

PERISTEROP'ODES: a division or sub-order of the *Gallinæ*, including the curassows and mound-builders, distinguished by having the hind toe long and on a level with the others as in pigeons. It is contrasted with *Alectoropodes*, or true fowls, which have the hind toe short and elevated.

PERISTOLE, n. *pĕr'ĭ-sĭs'tō-lē* [Gr. *peri*, around; mouth]: in *bot.*, the ring of bristles situated around the orifice or mouth of the seed-vessels in mosses; the simple or double membrane closing the mouth or opening in the theca of mosses, which membrane becomes divided into a definite number of laminæ, termed teeth, after the removal of the lid in the ripe state; in *zool.*, the space between the mouth and the margin of the calyx in vorticella, or between the mouth and the tentacles in a sea-anemone; the lip or margin of the mouth of a univalve shell. PERISTOMATIC, a. *pĕr-ĭ-stō-măt'ĭk*, of or pertaining to a peristome; in *bot.*, having cells surrounding a stoma.

PERISTREPHIC, a. *pĕr'ĭ-strĕf'ĭk* [Gr. *peri*, around, and *strephō*, I turn]: rotating or revolving—applied to the paintings of a panorama.

PERISTYLE, n. *pĕr'ĭ-stīl*, or PER'ISTYL'IUM, n. *-stĭl'-ĭ-ŭm* [Gr. *peris'tūlon*, a colonnade round a temple—from *peri*, around; *stulos*, a column or pillar]: a range of columns around the interior of a building or square; a building surrounded with columns.

PERISYSTOLE, n. *pĕr'ĭ-sĭs'tō-lē* [Gr. *peri*, around; *sus'tolē*, contraction—from *sustellō*, I draw together]: in the beating of the heart, the interval of time between the systole or contraction, and the diastole or dilatation, of the heart.

PER'IT, PELATIAH: American merchant: b. Norwich, Conn., 1785, June 23; d. New Haven, 1864, March 8. He was graduated from Yale in 1802, taught for a year, entered business in Philadelphia and in 1809 settled in New York where he engaged with a firm of shipping merchants. He was a member of the firm in 1817–63 and in 1853–63 was president of the chamber of commerce. In that position he rendered important service to the government by leading in the movement which put the United States treasury on a basis to meet the heavy expenses of the Civil War. In 1857 he served as a police commissioner and did much to restore the security of New York city, which was endangered by the contest between the 'Municipal' and the 'Metropolitan' police. He was a benefactor of many educational and charitable institutions and was deeply interested in Christian missions.

PERITHECIUM, n. *pĕr′ĭ-thē′shĭ-ŭm* [Gr. *peri*, around; *thēkē*, a box or case]: in *bot.*, the envelope surrounding the masses of fructification in some fungi and lichens; a conceptacle in cryptogams, containing spores, and having an opening at one end.

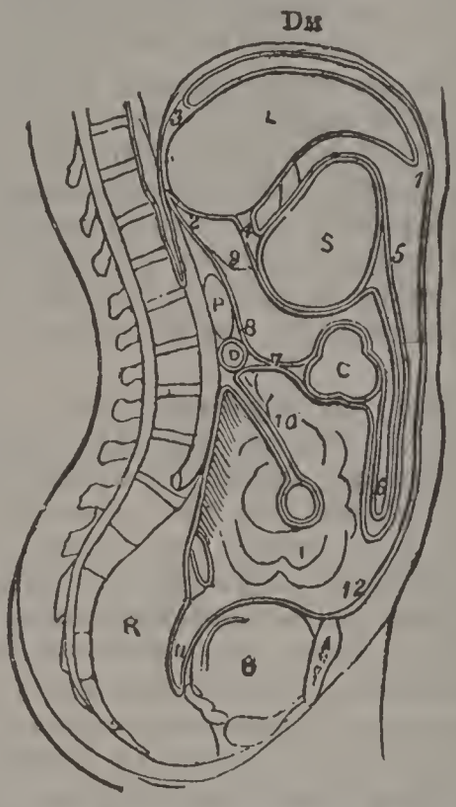
PERITOMOUS, a. *pĕr-ĭt′ō-mŭs* [Gr. *perit′ŏmos*, cut off all round about—from *peri*, around; *tomē*, a cutting—from *temnō*, I cut or cleave]: in *min.*, cleaving in more directions than one parallel to the axis.

PERITONEUM, or PERITONÆUM, n. *pĕr′ĭ-tō-nē′ŭm* [Gr. *perĭtonaī′on*, what is stretched round or over—from *peri*, around; *teinō*, I stretch]: thin membrane which lines the whole internal surface of the abdomen, and envelops more or less completely the several parts of the viscera, retaining them in their proper places, and at the same time allowing them to move freely when required (see below). PER′ITONE′AL, a. *-nē′ăl*, pertaining to the peritoneum.

PERITONE′UM: serous membrane inclosing the abdominal and pelvic viscera, and, like all membranes of this class, a shut sac, which, however, in the female is not completely closed, as the Fallopian tubes communicate with it by their free extremities. The P. more or less completely invests all the viscera lying in the abdominal and pelvic cavities, and is then reflected on the walls of the abdomen, so that there is a visceral and a parietal layer. Numerous folds are formed by the visceral layer as it passes from one organ to another. They serve to hold the parts in position, and at the same time inclose vessels and nerves. Some of these folds are termed *Ligaments*, from their serving to support the organs. Thus, we have ligaments of the liver, spleen, bladder, and uterus, formed by peritoneal folds. Others are termed *Mesenteries* [from the Gr. *meson*, the middle, and *enteron*, the intestine], and connect the intestines with the vertebral column. They are the Mesentery (q.v.), proper which has been already described, the ascending, transverse, and descending mesocolon, and the mesorectum. (The mesentery and transverse mesocolon are shown in the figure). Lastly, there are folds called *Omenta*, which proceed from one viscus to another. They are three in number—viz., the *Lesser* or *Gastrohepatic Omentum*, which extends from the under-surface of the liver to the lesser curvature of the stomach (No. 4 in fig.); the *Gastro-splenic Omentum;* and the *Great* or *Gastro-colic Omentum* (Nos. 5 and 6 in fig.), which consists of four layers of peritoneum, the two which descend from the stomach, and the same two returning upon themselves, and ascending as high as the transverse colon, where they separate, and inclose that organ. These separate layers are traced easily in the young subject, but in the adult they are more or less blended. The great omentum always contains some adipose tissue, which, in persons inclined to corpulency, often accumulates to an enormous extent. Its use appears to

be (1) to protect the intestines from cold by covering them anteriorly as with an apron, and (2) to facilitate their movement upon each other during their vermicular action.

Like all the serous membranes, the P. readily takes on inflammation from various exciting causes: this inflammation is termed Peritonitis (q.v.).



The Reflections of the Peritoneum:

DM, the diaphragm; S, the stomach; C, the transverse colon; D, the duodenum; P, the pancreas; I, the small intestines; R, the rectum; B, the urinary bladder; 1, the anterior, and 2, the posterior, layer of peritoneum; 4, the lesser omentum; 5 and 6, the greater omentum; 7, the transverse mesocolon; 10, the mesentery encircling the small intestine; 11, the recto-vesical fold; 12, the anterior layer traced upward upon the internal surface of the abdominal walls to the point (1) with which the examination commenced.—From Wilson's *Anatomist's Vade-Mecum*.

PERITONI'TIS: inflammation of the peritoneum or serous membrane inclosing the abdominal and pelvic viscera; a disease which may be either acute or chronic.

Acute P. generally presents well-marked symptoms. It commences sometimes with a chill, but severe pain in the abdomen is usually the first symptom. The pain is at first sometimes confined to particular spots (usually in the lower abdomen), but it soon extends over the whole abdominal region. It is increased, on pressure, to such an extent that the patient cannot even bear the weight of the bedclothes; and to avoid, as far as possible, internal pressure upon the peritoneum, he lies perfectly still, on his back, with the legs drawn up, and breathes by means of the ribs, in consequence of the pain occasioned by the descent of the diaphragm in inspiration. The breathing is naturally shallow in these cases, and less air being admitted at each movement of

respiration, the number of those movements is increased; there are perhaps 40 or even 60 respirations in a minute, instead of 18 or 20. The pulse is usually very frequent, often 120 or more in the minute, and small and tense, though occasionally strong and full at the commencement of the attack. After the disease has continued a certain time, the belly becomes tense and swollen; the enlargement being caused at first by flatus, afterward also by the effusion of fluid, as may be ascertained by percussion and auscultation.

The progress of the disease is in general rapid. In fatal cases, death takes place usually within a week, often sooner. The symptoms indicating that the disease is advancing toward a fatal termination are great distention of the abdomen, a very frequent and feeble pulse, a pinched and extremely anxious appearance of the face, and cold sweats.

Peritonitis may be primary, or secondary to some disease in one of the abdominal organs. Primary peritonitis usually arises from wounds of the abdomen, but occasionally, though surely, follows a surgical operation. Spontaneous peritonitis, that is peritonitis arising without any apparent cause, is said to occur, but most cases of this nature are due to some poison in the blood—not infrequently to gonorrhea. Secondary peritonitis is most commonly due to perforation of some portion of the stomach or intestine by an ulcer with consequent escape of the contents into the peritoneal cavity, or to rupture of an inflamed appendix (see APPENDICITIS) and the discharge of pus. It occurs also by extension of the inflammatory process from one of the abdominal organs caused by the peritoneum. It is not infrequent in inflammatory diseases of the uterus and Fallopian tubes, especially gonorrheal inflammation of these structures.

The treatment in this dangerous disease should be exclusively in the hands of the medical practitioner. Formerly opium was given freely with the view of securing sleep to the patient, and quiet to the inflamed membrane by arresting the peristaltic movements of the bowels. The patient was kept on low diet, milk chiefly, with cracked ice, and hot or cold applications were made to the abdomen. This treatment is still followed at times in cases of primary peritonitis, but when the disease is secondary to perforation immediate operation is usually now resorted to. An operation is also occasionally performed as a preventive measure in cases of intestinal ulcer or of appendicitis when perforation of the bowel appears to be impending.

Chronic peritonitis occurs in two forms, which differ in their origin and degree of fatality, but are very similar in symptoms. In the first, the inflammation is of the ordinary character, and though the disease sometimes originates spontaneously, it is more frequently the sequel of an imperfectly cured acute attack; the second

is due to tuberculosis. This is usually secondary to the presence of the disease in the lungs or other part of the body, but the tuberculous process may manifest itself first in the peritoneum.

The symptoms of chronic peritonitis are more obscure than those of the acute form. There is abdominal pain, often slight, and not always constant, increased by pressure, or sometimes felt only when pressure is made. The patient complains of a sensation of fulness and tension of the belly, though its size is not visibly increased; of a loss of appetite; and of nausea and vomiting; and the bowels are usually more or less out of order. After a time, the abdomen enlarges, and becomes tympanitic, or more or less filled with fluid; and death gradually ensues from debility and emaciation, unless the fatal issue is accelerated by an acute inflammatory attack. It is not always easy to determine, during life, whether the disease belongs to the first or second form. When its origin cannot be traced to a preceding acute attack, to local abdominal injury, or to chronic affections of the abdominal viscera, there is strong reason to believe it to be tuberculous, especially if the patient is the subject of pulmonary or articular tuberculosis.

Little can be done in the way of treatment, further than mitigating the most distressing symptoms, and possibly retarding the final issue. The frequent application of a few leeches to the abdomen, followed by warm poultices, occasional blisters, attention to the bowels, which, if costive, should be acted on by gentle laxatives, and a mild, nourishing, but unstimulating diet, are likely to be of service. In cases of tuberculous peritonitis the operation of opening the abdomen (laparotomy) has sometimes been followed by cure.

PERITROCHIUM, n. *pĕr'ĭ-trō'kĭ-ŭm* [Gr. *peritrŏchos*, circular, round—from *peri*, around; *trochos*, a wheel—from *trechō*, I run]: in *mech.*, a wheel fixed upon an axle, so that both can be moved by a rope passing round the wheel; one of the mechanical powers called the *wheel and axle*.

PERITROPAL, a. *pĕr-ĭt'rō-păl* or *pĕr'ĭ-trō'păl* [Gr. *peri*, around; *tropē*, a turning—from *trepō*, I turn]: rotatory; circuitous; in *bot.*, applied to the axis of a seed perpendicular to the axis of the pericarp to which it is attached.

PERITYPHLITIS, n. *pĕr'ĭ-tĭf-lī'tĭs* [Gr. *peri*, round about; *tuphlos*, blind]: inflammation around the cecum. See APPENDICITIS.

PERIVASCULAR, a. *pĕr'ĭ-văs'kū-lĕr* [Gr. *peri*, round about; L. *vasculum*, a small vessel—from *vas*, a dish]: applied to canals which surround and inclose the blood-vessels.

PERIVISCERAL, a. *pĕr'ĭ-vĭs'sĕr-ăl* [Gr. *peri*, around; L. *vĭscĕra*, the internal organs]: applied to the space surrounding the viscera.

PERIWIG, n. *pĕr'ĭ-wĭg* [a corruption, under the influence of E. *wig*, of F. *perruque*, a lock or tuft of hair, a wig—from It. *perruca*: Dut. *peruik;* Ger. *perrücke*, a wig: perhaps connected with Sp. *peluce;* L. *pellucus*—from *pellis*, a skin]: a kind of close cap formed of an intertexture of false hair, worn by men to conceal baldness; a wig or peruke; v. to dress with false hair. PER'IWIGGING, imp. PER'IWIGGED, pp. *-wĭgd.*

PERIWINKLE, n. *pĕr'ĭ-wĭng'kl* [AS. *pinewincla*, the pinwinkle: Scot. *peeric*, small, little; AS. *wincle*, a whelk], (*Littorina*): genus of gasteropodous mollusks of order *Pectinibranchiata* and family *Littorinidæ*, having a proboscis-shaped head, a foot of moderate size, a single gill, and a rudimentary siphonal canal; the shell turbinate, thick, with few whorls, and no nacreous lining; the operculum of few whorls. A very well-known species is the COMMON PERIWINKLE (*L. littorea*), a kind of sea-snail, a mollusk most abundant on some rocky British coasts, living in the lowest zone of sea-weeds between tide-marks, and feeding on fuci, etc. It is oviparous. No mollusk is more generally collected and used for food. Children are usually employed in collecting it. It is boiled in the shell, and so sold, often on the streets, and chiefly to the poorer classes, though few mollusks are more pleasant. It is called *Wilk*, *Wulk*, or *Whulk* in Scotland, but is quite different from the *Whelk* (q.v.) of the English, notwithstanding the sameness of name. There are other common species, *L. neritoides* and *L. rudis*, less esteemed, *L. rudis* is viviparous, and the shells of the young within the mantle of the parent often make it gritty and unpleasant to eat.—In the U. S., the name Periwinkle is given to various whelks or conch-shells destructive to oysters.

PERIWINKLE, n. *pĕr'ĭ-wĭng'kl* [F. *pervenche*—from L. and It. *pervinca*, the plant periwinkle—from L. *vincĭo*, I bind]: a creeping or binding plant—probably so called from its growth being similar to a tangled mass of twigs; *Vinca*, genus of plants of nat. order *Apocynaceæ* having a 5-cleft calyx, and a slaver-shaped corolla beared at the throat, with five obliquely truncated segments. The leaves are opposite and evergreen; the flowers grow singly or in pairs from the axils of the leaves. The LESSER PERIWINKLE (*V. minor*), native of many parts of Europe, growing in woods and thickets, is a half-shrubby plant with trailing stems, rooting at their extremities, ovato-lanceolate leaves, and pale-blue—sometimes white or reddish-purple—salver-shaped flowers. The GREATER PERIWINKLE (*V. major*), which has much larger flowers and ovato-cordate ciliated leaves, is native of s. Europe, and is found in a few places in s. England. Both these species are very frequently planted in shrubberies and gardens, rapidly cover unsightly objects with pleasing green foliage, and produce their beautiful flowers at almost all seasons of the year, even

in winter if the weather is mild. The HERBACEOUS PERIWINKLE (*V. herbacea*), Hungarian species, is remarkable for abundance of flowers. The YELLOW PERIWINKLE (*V. lutea*) is native of s. parts of N. America. The ROSE-COLORED PERIWINKLE (*V. rosea*), native of Madagascar, is a favorite greenhouse plant.—The name Periwinkle was formerly *Perwinké*. Chaucer speaks of the 'fresh perwinké rich of hue.' It is probably from the French *perveneche*, and that from the Latin *vinca*.

PERJURE, v. *pėr'jûr* [F. *parjurer*, to perjure: F. *parjure*, OF. *perjure*, perjured—from L. *perjurus*, a perjured person: L. *perjūrĭŭm*, a false oath—from *per*, through; *jūro*, I swear]: to swear falsely; in a *court of justice*, to swear to as truth that which is known to be false. PER'JURING, imp. PER'JURED, pp. *-jûrd:* ADJ. having sworn falsely, as a witness in a court of justice—usually followed by a *pron.* and *self*, as, he perjured himself. PER'JURER, n. *-ėr*, one who swears falsely. PER'JURY, n. *-jûr-ĭ*, act or crime of wilfully giving false evidence on any material point in a court of justice or before other constituted authority, when put on oath or affirmation. In a number of jurisdictions statutes are in effect which provide that oath or declarations on specified occasions shall be considered as perjury. Whether or not one testified voluntarily or under compulsion does not affect the question of perjury. Under a Federal statute one is guilty of perjury who falsely states, certifies to, or declares falsely before a tribunal, or a person authorized under a law of the United States, relating to any material matter which he does not believe to be true. Generally perjury is a misdemeanor and punishable as such, but in some states it has been made a felony; the offense takes place immediately upon completing the false oath before a court, person, or officer, lawfully authorized to take same; and one is not liable for perjury on a voluntary oath, or one not required by law, or upon a false statement, or one made under mistake, or unusual circumstances such as excitement, or fear, or without knowledge of the falsity of the statement; whether any injury resulted from the false oath, or the same was credited or not, is not material to the charge. Perjury must be proven beyond all reasonable doubt and cannot be established by the proof of one witness; the punishment therefor must be only as provided by law, and is usually prescribed by statute. Damages cannot be recovered in a civil action on account of the commission of perjury, or procuring another to commit perjury. A person procuring another to commit perjury is guilty, if the perjury is actually committed, of subornation of perjury; this may be proven by one witness, and the person found so guilty may be convicted. If one attempts to procure another to commit perjury, but perjury is not actually committed. he is guilty of incitement to commit perjury and may, under some statutes, be indicted and punished.

PERK, a. *pėrk* [W. *perc*, trim, neat; *percu*, to trim, to smarten: comp. Low Ger. *prick*, smart, fine; Icel. *sparkr*, lively: perhaps connected with *pretty*]: smart; trim; brisk; airy: v. to make trim or smart; to hold up the head with affected smartness; in *OE.*, to dress; to prank. PERK'ING, imp. PERKED, pp. *pėrkt*. PERKY, a. *pėrk'ĭ*, pert; jaunty; trim: same as PERT, which see.

PERKIN, n. *pėrk'ĭn:* a kind of weak cider, made by steeping the refuse pomace in water; ciderkin.

PERKINS, *pėr'kĭnz*, ELISHA: physician: 1741, Jan. 16—1799, Sep. 6; b. Norwich, Conn. He began the practice of medicine with his father at Plainfield, Conn. He invented, about 1796, some instruments which he named metallic tractors, for the cure of local pains, inflammations, and rheumatism. The tractors, he claimed, were of peculiar and secret composition, but it is asserted that one was of iron, the other brass; they were three inches long, and pointed. In use, they were drawn downward over the affected part of the patient for 20 minutes. The wonder is that many learned men in the United States and abroad approved the process. It was known as 'Perkinsism;' and 12 physicians in Copenhagen tested it, and published a volume in its favor, giving details of its effects. Dr. Perkins' son published a book, in London, introducing the method; and there it inspired so much faith that a Perkinsian institution was opened, of which Lord Rivers was president. Recommendations were signed by many physicians and clergymen, and thousands of cures published. Heated discussions arose, and a satire, *Terrible Tractoration*, was put forth by Thomas G. Fessenden, in defense of the tractors. The history of this supposed remedy belongs doubtless among the many illustrations of the power of the mental state over the physical. Dr. Perkins invented also an antiseptic, and visited New York 1799 when he undertook to prove its efficacy during the yellow fever epidemic raging in that city during that year, but he himself fell a victim to the fever and died before he had succeeded in proving the worth of his invention.

PER'KINS, JACOB: inventor: 1766, July 9—1849, July 30, b. Newburyport, Mass. While a goldsmith in his native place, he invented a process of plating shoe-buckles; later, made dies for the Mass. copper coins; about 1795, designed a machine for cutting and heading nails; introduced steel-plates for bank-notes, with the purpose of preventing counterfeits; resided in Boston, New York, and Philadelphia; and 1818, went to England, getting a contract to engrave plates for the Bank of Ireland. There he carried on a large manufacturing business, labored to perfect steam-machinery, invented a method of transferring steel-engravings from one plate to another, and devised a bathometer to measure depth of

water, a pleometer to determine the speed of vessels, and a steam gun able to penetrate 11 one-inch pine planks, with a feeding attachment, delivering 1,000 balls per minute. He received silver and gold medals from the London Soc. of Arts. He died in London.

PER'KINS, JUSTIN, D.D.: missionary: 1805, Mar. 12—1869, Dec. 31; b. Springfield, Mass.; son of a farmer. He graduated at Amherst 1829; was at Andover Theol. Seminary two years, and tutor at Amherst one year. Offering himself to the Amer. Board of Missions, he was sent to the Nestorians of Persia; and 1834 founded the mission at Oroomiah. He translated the Bible and other books into the native language, wrote a commentary on Genesis and Daniel, and was active in establishing mission schools. In 1842 he visited this country with the Nestorian bp., Mar Yohannan, who was an early adherent. The next year, returning to his field, he accompanied a deputation to the Persian capital, and successfully remonstrated against the persecutions in progress. Again he visited his native land 1858; and 1869, exhausted by his labors, made his third visit, only to die at Chicopee, Mass. His devoted and eminent mission work extended through 35 years. His books in English were: *A Residence of Eight Years in Persia* (1843); *Mission Life in Persia* (1861).

PER'KINS, THOMAS HANDASYD: philanthropist: 1764, Dec. 15—1854, Jan. 11; b. Boston. Trained in his father's mercantile business, he became partner with his brother James in San Domingo trade, and, after visiting ports on the Pacific, in trade with the n.w. coast, Canton, and Calcutta, acquiring great wealth and retiring 1822. He was in the Mass. legislature for about 18 years, from 1805; was lieut.col. of militia; and, 1827, projected the first railway in the United States, the Quincy. His house and grounds, worth $50,000, he gave to the Perkins Institution for the Blind, contributed largely to the Mass. Gen. Hospital, the Merchants' Library Assoc., the Boston Athenæum, and was active in promoting the Bunker Hill and Washington monuments. His mother, Elizabeth (Peck) P., founded the Boston Female Asylum. He died in Brookline, Mass. A memoir of his life, including extracts from his diaries and sketches of travel, was pub. by Thomas G. Cary 1856.

PER'KIN WARBECK: see HENRY VII.

PERLEBERG, *pĕr'lā-bĕrch:* town of Prussia, province of Brandenburg, on the Stepnitz, with woolen and machine manufactures, tanneries, etc. Pop. 7,900.

PERM, *pĕrm:* most eastern govt. of European Russia; bounded e. by Siberia, n., w., and s. by the govts. of Vologda, Viatka, and Orenburg respectively; 128,210 sq. m.—more than the area of Italy. Pop. (1897) 3,003,208. P. is divided by the Ural Mountains into two unequal parts, of which the smaller portion is on the e. or Siberian side of mountains, though, for administrative

purposes, it is reckoned as a part of European Russia. About three-fourths of the govt. are occupied by the Ural range, which in some places reaches the height of 4,000 ft.; but which slopes so gradually toward the plain, that the traveller reaches the summits before he is aware that he has made any unusual ascent. About two-thirds of the entire surface, comprising all the n. districts, are covered with forests, one-tenth of the area is in meadows, and about the same extent is under cultivation. The more important rivers belong to the systems of the Volga and the Ob. The Kama, together with the Tshousovaia and other affluents from the Ural Mountains, flow s.w., join the Volga, and thus form an important means of communication between the mining districts of P. and Europe. The Tura, the Sosva, and the Losva communicate with the Ob; and access is opened to the White Sea and the Arctic Ocean by the rivers Dwina and Petchora. The climate is healthful, though rigorous. At the end of July, the nights are cold; in the middle of Sep., falls the first snow. In Nov., when the whole face of nature is covered with snow, the transport of goods by sledges is busily carried on everywhere. In Jan., the cold is so great that quicksilver sometimes freezes. At the end of Mar., the snow begins to melt, and before the middle of May, though the cold is still great, the country is clothed in the green of early spring. The chief products are gold, copper, magnetic iron ore, rock-crystal, jasper, agate, topaz, porphyry, malachite, porcelain clay, salt (obtained from salt springs), coal, alabaster, marble, etc., and diamonds in small quantities. The inhabitants are chiefly Russians, but there are also numbers of Tartars, Bashkirs, and Finns. The agricultural produce consisting chiefly of corn, vegetables, flax, and hemp, is more than sufficient for local consumption, and is exported to some extent to the neighboring govts. The immense forests of the country yield wood for fuel, and timber for construction of the barges which, during summer, are floated down the rivers, freighted with products of the mines. Three-fourths of the govt. are covered by forest; hardly more than one-twelfth is yet under the plow. The numerous works and factories employ more than 100,000 hands, and recently their annual produce was estimated at nearly $30,000,000, of which a third was the value of iron. Here, also, is a platina mine, said on good authority to be the richest in the world. The iron of P. is famous all over Europe. The commerce of the govt. is considerable. The fair of Irbit (q.v.) is, after that of Nijni-Novgorod, the most important in the Russian empire. The transit trade, however, is much greater than the local trade. The great highway from Siberia to European Russia passes through P., and the govt. communicates by means of the Volga, Petchora, and the Ob, with the Baltic, White, and Caspian Seas. The central administration of mines has its seat in Ekaterinburg.

Perm was a portion of ancient Biarmia, inhabited in earliest historical times by Finnish tribes, and even then famous for its commerce, especially with Asia. In the 11th century it became connected commercially with the principality of Novgorod, which, little by little, conquered and took possession of the country. At the close of the 15th century both it and Novgorod were annexed to the territories of the Prince of Moscow, and about the same time the Christian religion was introduced.

PERM: town of European Russia, capital of the government of Perm; on the Kama, 1,357 m. e.s.e of St. Petersburg; founded 1729, under the name of the Egotinsky copperwork, the first colony in the government of Perm. Its own commerce is not important, but it is the seat of extensive transit trade. Here goods floated down the Tshousovaia from the Ural Mountains are transferred to larger vessels, and forwarded by the Kama and Volga past Nijni-Novgorod and Rybinsk, thence to St. Petersburg. Goods from the sources of the Kama, metals, corn, tallow, and leathers, as well as Siberian and Chinese articles, are sent from Perm to the Russian interior, and to Europe generally. Near the town is a large cannon-foundry, possessing one of the largest steam-hammers in the world. Pop. (1897) 45,403.

PERMANENT, a. *pėr'mă-nĕnt* [F. *permanent*—from L. *permănens* or *permănen'tem*, remaining, enduring—from *per*, through; *manĕō*, I remain or last: It. *permanente*]: of long continuance; durable; continuing in the same state without change. PER'MANENTLY, ad. *-lĭ*. PER'MANENCY, n. *-nĕn-sĭ*, or PER'MANENCE, n. *-nĕns* [F.—L.]: continuance in the same state without change; duration. PERMANENT WAY, the bed or superstructure on which the rails are laid in a finished railway.—SYN. of 'permanent': constant; lasting; enduring; fixed; abiding; continuing; persistent.

PERMANGANATE, n. *pėr-măn'gă-nāt* [*per*, and *manganate* (see MANGANESE)]: a compound of permanganic acid with a base, one of which enters into Condy's disinfectant. PER'MANGAN'IC ACID, *-găn'ĭk*, the highest oxidized form of manganic acid.

PERMEATE, v. *pėr'mē-āt* [L. *permĕātus, passed through* or penetrated—from *per*, through; *mĕō*, I go or pass]: to penetrate and pass through a substance without causing any rupture or displacement of its parts; to pass through the pores of a body. PER'MEATING, imp. PER'MEATED, pp. PER'MEA'TION, n. *-ā'shŭn*, the act of passing through the pores or interstices of a body. PER'MEABLE, a. *-ă-bl* [F.—L.]: that may be passed through, as water through a porous body, or as light through glass. PER'MEABLY, ad. *-blĭ*. PER'MEABIL'ITY, n. *-bĭl'ĭ-tĭ*, the quality or state of being permeable. In *Electricity*, the ability of any substance to carry or transmit magnetism compared with air as the unit medium. See MAGNETISM.

PERMIAN, *per'mĭ-an* (or MAGNESIAN LIMESTONE, or DYAS) GROUP: lower division of the New Red Sandstone rocks, which were separated, chiefly on paleontological grounds, from the upper portion, and being, 1841, without a collective name, were called P. by Murchison because he found them largely developed in that portion of Russia which composed the anc. kingdom of Permia. The name Magnesian Limestone is given to them because of the predominant deposit; and Dyas has been proposed by some German geologists, to correspond with Trias, the name universally accepted for the upper section of the New Red Sandstone series.

The Permian strata occupy in Russia an area twice the size of France, and contain an abundant and varied suite of fossils. They are largely developed also in Germany, and as they have been there carefully studied, and described by numerous geologists, the rocks of that country may be considered types of the group. They have been thus grouped: 1. Bunterschiefer. 2. Zechstein. 3. Kupferschiefer or Mergel. 4. Rothe-todtliegende.

The Bunterschiefer consists of red and mottled marl and sandstone, which have been separated from the Triassic Bunter Sandstein, because of the occurrence in them of fossils which have a paleozoic facies. The Zechstein is chiefly a compact limestone with beds of colored clays, and cellular magnesian limestone. The well-known Stinkstein belongs to this series; it is a dark-colored and highly bituminous limestone, which gives out an offensive odor when struck or rubbed. The name Zechstein (literally, minestone) was given to these beds because they must be mined or cut through to reach the Kupferschiefer below. This latter is a marl slate, richly impregnated with copper pyrites, for which it was extensively wrought. It contains numerous beautifully preserved fossil fish belonging to the genera Palæoniscus, Cœlacanthus, Platysorus, etc. The strange name of Rothe-todtliegende (red dead-layers) was given to a large deposit of red sandstone and conglomerate, by the miners, because the copper obtained from the beds above died out when they reached these red rocks.

The succession of rocks given by Murchison as occurring in Permia are easily correlated with those of Germany. They are: (1) conglomerates and sandstones, containing the remains of plants; (2) red sandstones and shales, with copper ore and vegetable remains; (3) sandstones, grits, and fossiliferous limestones, with interstratified beds of marl and gypsum, the marls occasionally containing plants, also seams of impure coal.

In England, the P. rocks are somewhat extensively developed in Durham, where they have been described by Sedgwick and King. From this county, they continue in a narrow strip bordering the Carboniferous beds down the centre of England, until they are lost near Nottingham. In Cheshire, Shropshire, Stafford, and Warwick, they underlie the salt-bearing Triassic rocks. The Durham strata are grouped as follow:

1. Concretionary and amorphous limestone, 2. Brecciated and pseudo-brecciated limestone,	= Bunterschiefer.
3. Fossiliferous limestone, 4. Compact limestone,	= Zechstein.
5. Marl slate,	= Kupferschiefer.
6. Inferior various-colored sandstone,	= Rothe-todtliegende.

The fractured bones and teeth of saurians, found in the basement bed of the sixth group, were considered the earliest evidence of the existence of reptiles, until the discovery of the Archegosaurus in the Carboniferous rocks.

The known organic remains of this period are neither remarkable nor abundant. Many paleozoic forms became extinct within this period; among them are the remarkable Sigillaria and the Neuropteris of the coal beds, the well-known brachiopod, Producta, and several genera of heterocercal-tailed fish. Some new forms appear, especially the labyrinthodont reptiles, which begin in the upper Carboniferous beds, increase in the P., and reach their maximum in the Triassic group.

PERMISSION, n. *pėr-mĭsh′ŭn* [F. *permission*—from L. *permissĭōnem*, leave—from *permis′sus*, suffered to pass through—from *per*, through; *missus*, sent—from *mitto*, I send: It. *permissione*]: leave, license, or liberty granted; allowance. PERMIS′SIVE, a. *-mĭs′sĭv*, not hindering; granting liberty; suffered without hindrance; allowing by statute, but not enforcing. PERMIS′SIVELY, ad. *-lĭ*. PERMIS′SIBLE, a. *-sĭ-bl*, that may be permitted or allowed. PERMIS′SIBLY, ad. *-blĭ*. PERMISSIVE BILL (see LOCAL OPTION: TEMPERANCE).

PERMIT, n. *pėr′mĭt* [L. *permittĕrĕ*, to let through, to allow—from *per*, through; *mittĕrĕ*, to let go, to send: It. *permettere:* F. *permettre*]: a written license or permission by the custom-house authorities, showing that the duties on certain goods that are removed have been paid; leave: V. *pėr-mĭt′*, to allow without command; to give leave or liberty to without authorizing or approving; to concede. PERMIT′TING, imp. PERMIT′TED, pp.—SYN. of 'permit, v.': to allow; grant; bestow; let; admit; suffer; tolerate.

PERMUTE, v. *pėr-mūt′* [F. *permuter*—from L. *permutārĕ*, to change or alter completely—from *per*, through; *mūto*, I change: It. *permutare*]: to change the order or arrangement of, as letters or things. PERMU′TING, imp. PERMU′TED, pp. PERMU′TABLE, a. *-tā-bl*, that may be changed the one for the other. PERMU′TABLY, ad. *-blĭ*. PERMU′TABLENESS, n. *-bl-nĕs*. PERMUTATION, n. *pėr′-mū-tā′shŭn* [F.—L.]: the successive changing or varying the arrangement of *letters* or *things* in every possible order: in *math.*, rearrangement of objects in line according to a change in their order; thus differing from *Combination* in *math.*, which is a selection of a number of objects from a given set of objects, without any regard to the order in which they are placed The objects are called elements, and the combinations are divided into classes, according to the number of elements

in each. Let the given elements be the four letters *a*, *b*, *c*, *d;* the binary combinations, or selections of two, are *ab*, *ac*, *ad*, *bc*, *bd*, *cd*—six in all; the combinations of three are *abc*, *abd*, *acd*, *bcd*—four in all; while there is only one combination of four—namely, *abcd*.

Permutation has reference to the order of arrangement; thus, the two elements, *a* and *b*, may stand *ab* or *ba*, so that every combination of two gives two permutations; the three elements, *a*, *b*, and *c*, may stand *abc*, *acb*, *bac*, *bca*, *cab*, *cba*, one combination of three thus affording six permutations. The combinations of any order with all their permutations are called the *Variations*. Formulas are given in works of algebra for calculating the number of permutations or combinations in any given case. Suppose seven lottery-tickets marked 1, 2, 3, to 7, and that two are to be drawn; if it is asked, how many possible pairs of numbers there are, this is a question of the number of combinations of seven elements, *two* together, which is found to be 21. If we want to know how many times the same seven persons could sit down to table together with a different arrangement each time, this is to ask how many permutations seven objects admit of, and the formula gives $7 \times 6 \times 5 \times 4 \times 3 \times 2 = 5{,}040$. The theory of probabilities is founded on the laws of combination. Thus, in the case of drawing two tickets out of seven, since there are 21 possible pairs, the chance or probability of drawing any particular pair is 1 in 21, or $\frac{1}{21}$. In working out questions in 'combinations,' advantage is often taken of the fact that whatever number of elements be *taken* from a group to form a combination, the number *left* gives the same number of combinations; thus the number of combinations of 10 elements, *three* together, is the same as that of 10 elements, *seven* together, etc.

PERN: see Honey Buzzard.

PERNAMBUCO, *pĕr-nâm-bô'kō:* maritime province of Brazil, bounded s.e. by Bahia and Alagoas, n.w. by Piauhi, Ceara, and Parahiba; 50,000 sq. m. The coast is flat, and fringed with coral-reefs, which render navigation dangerous. The chief river is the San Francisco, which forms the s. boundary, and includes in its basin the greater portion of the province. The banks of this river comprise many rich, expansive meadows, and here the cattle are reared which, in the form of beef and hides, form an important article of export at the seaport of P. Much of the cotton and sugar brought to the market of the cap. is harvested about 300 m. inland, in regions fertilized by streams that rise at the base of the Santa Barbaretta Hills, the first hill-range in this district that arrests the trade-wind from the Atlantic, laden with rain. The San Francisco railway, 77½ m. long, has done much to encourage the cultivation of sugar and cotton. The province produces sugar-cane, cotton, maize, mandioca or tapioca, cocoa-nuts, and other fruits, vegetables, and medicinal herbs. From the forests, balsams, gums, and dye-woods are obtained.—Pop. 1,100,000.

PERNAMBU'CO, or RECIFE, *rā-sē'fā:* city; most eastern seaport of Brazil; at the mouths of the Biberibe and Capeberibe; lat. 8° 4′ s., long. 34° 52′ w.; 80 m. s. of Parahiba. It is the greatest sugar-mart in Brazil, and third in commercial importance of the cities of that republic. It consists of three portions, connected by roads and bridges—*Recife* proper, the chief seat of commerce, on a peninsula; *S. Antonio,* the middle district, on an island between the peninsula and the mainland; and *Boa Vista,* on the mainland. The inner harbor, which has a depth of 10 to 30 ft., is formed by a reef serving as a breakwater, traceable for several hundred m. at a varying distance along the Brazilian coast, and rising off Pernambuco into a straight wall with nearly level top. Opposite the n. extremity of the city is an opening in the reef, resembling an artificial cut, and forming a passage of sufficient width to admit of the entrance of vessels drawing 16 ft. of water. No port is more easily accessible than the outer harbor of Pernambuco. There is a light-house in the harbor, and it is defended by several forts. Formerly, the city was extremely dirty, the streets unpaved, and much inconvenience was suffered from lack of water. Of late years, however, many improvements have been made; waterworks have been erected, extensive and spacious quays formed along the rivers, and the streets have mostly been paved and lighted. Numerous *collegios* and other educational institutions have been established, and the growing wealth and commercial prosperity of the city have been accompanied by increasing comfort and refinement. The principal exports are sugar, cotton, rum, hides, and dyewoods; imports are woolens and cottons, hardware, silks, wines, etc. Annual values of exports and imports average about $10,000,000. Pop. 190,000.

PERNAMBU'CO WOOD: see BRAZIL WOOD.

PERNANCY, n. *pėr'năn-sĭ* [OF. *pernanee,* a taking—from OF. *prener;* F. *prendre,* to take—from L. *prehendo*]: in *law,* the taking, receiving, or enjoying, as the profits of an estate; a taking or receiving tithes in kind. PERNOR, n. *pėr'nėr,* the person who receives and enjoys the profits: see MAINPERNOR.

PERNICIOUS, a. *pėr-nĭsh'ŭs* [F. *pernicieux*—from L. *pernicĭōsus,* ruinous, very destructive—from *per,* through; *neeārĕ,* to kill; *nex* or *neecm,* death]: highly injurious; tending to injure or destroy, as health or morals; deadly; destructive. PERNI'CIOUSLY, ad. *-lĭ.* PERNI'CIOUSNESS, n. *nĕs,* the quality of being very injurious or destructive.—SYN. of 'pernicious': ruinous; noxious; injurious; hurtful; fatal; mischievous.

PERNICKETY, a. *pėr-nĭk'ĭ-tĭ* [F. *par,* by, through; *niquet,* a trifle]: in *Scot.,* precise in trifles; very trim in dress.

PERONATE, a. *pĕr'ō-nāt* [L. *perōnātus,* rough-booted

—from *pēro*, a boot made of rawhide]: in *bot.*, covered with woolly matter, becoming powdery externally.

PERONOSPORA, *pĕr-ō-nŏs'pō-râ* [Gr. *peronē*, brooch pin; *sporos*, seed]: genus of fungi that infest plants; the species live within the tissues or on the surface of the plant, and thence draw their nourishment; they cause some of the most destructive plant-diseases known—e.g., potato-rot, caused by *P. infestans;* grape mildew, caused by *P. viticola.* About 70 species are known.

PERORATION, n. *pĕr'ō-rā'shŭn* [OF. *peroration*—from L. *perōrātĭōnem*, the finishing part—from *per*, through; *oratĭo*, a speech; F. *péroraison*]: the concluding part of an oration or of a speech.

PEROSI, *pā-rō'zē*, Don Lorenzo: Italian composer: b. Tortona, Piedmont, Italy, 1872, Dec. 20. He was educated at the Milan Conservatory, studied for the priesthood and was ordained at 23. His compositions are exclusively confined to religious subjects and have gained for him much fame throughout Italy, though they are less successful with English and German critics. He was appointed honorary maestro of the Papal Choir in 1898. He has composed many masses and among his other compositions are: *La passione de Cristo* (1897); *La risurrezione di Lazaro* (1898); *Il natale del Redentore* (1899); etc.

PÉROUSE, La. See Lapérouse, Jean-François Galaup.

PEROWNE, *pĕ-rown'*, John James Stewart: English Anglican prelate: b. Burdwan, Bengal 1823, March 13. He was educated at Norwich Grammar School and Corpus Christi College, Cambridge, ordained in 1847, and appointed curate at Tunsted the same year. He was assistant master in King Edward's School, Birmingham, in 1849, for a time a lecturer in divinity at King's College, London, and from 1862 to 1872 vice-principal of Saint David's College, Lampeter. He was one of the Old Testament Revision Committee (1870–84), and in 1875–8 was Hulsean professor of divinity at Cambridge. From 1878 till 1891 he was Dean of Peterborough, and in the last-named year was consecrated bishop of Worcester. He resigned his see in 1901 and was succeeded by Charles Gore. His published works include: *The Book of Psalms*, a new translation, with notes (1864); *Immortality* (1868); *The Church, the Ministry, and the Sacraments;* an Arabic grammar. He edited the *Cambridge Bible for Schools* and the *Cambridge Greek Testament* for schools.

PEROXIDE, n. *pėr-ŏks'id* [L. *per*, through, and Eng. *oxide*]: that oxide of a base which contains the largest proportion of oxygen.

PERPEND, v. *pėr-pĕnd'* [L. *per*, through, thoroughly; *pendo*, I weigh]: in *OE.*, to weigh in the mind; to consider attentively. Perpend'ing, imp. Perpend'ed, pp.

PERPENDER, n. *pėr-pĕn′dėr*, or PER′PENT-STONE, n. *-pĕnt* [F. *parpaing*]: a large stone in a building reaching through a wall, and appearing on both sides of it, a through-band; a coping-stone.

PERPENDICULAR, a. *pėr′pĕn-dĭk′ū-lėr* [F. *perpendiculaire;* L. *per′pendic′ulāris; perpendĭc′ulum*, a plumb-line; *perpen′do*, I poise thoughtfully—from *per*, through; *pendo*, I poise or weigh]: hanging or extending in a right line from any point; at right angles to any plane or line; vertical. A straight line standing on another straight line is said to be P. to that other when the angles that it makes on both sides are equal (see ANGLE). A line is said to be P. to a plane when it is at right angles to any line in that plane meeting it. Planes are said to be P. to each other when any line in the one plane P. to their common line of intersection is P. also to all lines meeting it in the other plane. P. in common usage refers to a direction at right angles to the surface of still water, and is synonymous with vertical. PERPENDICULAR, n. a line standing at right angles on another line. PER′PENDIC′ULARLY, ad. *-lĭ*. PER′PENDIC′ULAR′ITY, n. *-lăr′ĭ-tĭ*, the state of being perpendicular.

PERPENDICULAR FORTIFICATION: style of defensive milit. construction due to the Marquis de Montalembert, distinguished French gen., who published his work on the subject 1776. Vauban had, it was admitted, rendered the art of attack superior to that of defense. Montalembert strove to reverse this relation, and, in his endeavors, rejected entirely the bastion system of the older engineers. Instead of the occasional bastions, with intervening curtains (see FORTIFICATION), with which they surrounded their *enceinte*, he broke the whole polygon into salient and re-entering angles, the latter being generally right angles. Before the connected redans thus formed were counterguards of low elevation and ravelins, to which the approaches were through casemated *caponnières*. In the salient angle of each redan, he built a brick tower, 40 ft. in diameter, twelve-sided, and four stories high: the second and third tiers were built for heavy guns, and the upper loopholed for musketry. In the centre of the tower was a circular *réduit*, intended as a last refuge for the garrison. Montalembert maintained that from these towers every possible approach could be commanded, which to a great extent is true; but it must be remembered also that the greater space a gun commands, by so much the more is it raised above the plain, and rendered visible. These towers would have little chance against the rifled ordnance of the present day. His system was violently attacked by the French engineers, but Carnot subsequently adopted it, with some modifications, and it enters largely into the modern German defensive works. The system has never found favor with British engineers.

PERPENDICULAR STYLE, in Architecture: latest stage of Pointed Gothic in England. The P., often called the Tudor style, prevailed in England in the 15th c. and first half of the 16th, succeeding the Decorated style; and was thus in part contemporary with the Flamboyant style in France. These styles have much in common,

Nave of Winchester Cathedral.

but they derive their names from the features peculiar to each. Thus, the Flamboyant (q.v.) is distinguished by the flowing lines of its tracery; while the P. S. is remarkable for its stiff and rectilinear lines. The lines of the window-tracery are chiefly vertical, and the mullions are frequently crossed by horizontal bars. The mold-

ings are usually thin and hard. The same feeling pervades the other features of the style; the buttresses, piers, towers, etc., all are drawn up and attenuated, and present in their shallow recesses and meagre lines a great contrast to the deep shadows and bold moldings of the earlier styles. The art of masonry was well understood during the Perpendicular period, and the vaulting was admirably built. Fan-tracery Vaulting (q.v.) belongs to this style. The depressed or four-centre arch is another of its peculiar features. This arch, over doorways, has the moldings generally arranged in a square form over the arch, with spandrels containing shields, quatrefoils, etc. Panelling was also much used, the walls being frequently almost entirely covered with it, as in Henry VII.'s Chapel at Westminster. There are many well-known buildings of this style. Most of the colleges at Oxford and Cambridge belong to it, and in almost every cathedral and church of importance there are some specimens of it. Open timber-roofs are very common in the P. S., and are among the peculiar and beautiful features of English architecture. The roof of Westminster Hall, built by Richard II., is the largest instance of the P. S. ever erected.

PERPENT-STONE: see PERPENDER.

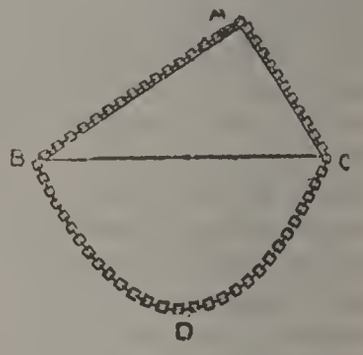
PERPETRATE, v. *pėr'pĕ-trāt* [L. *perpetrātus*, performed thoroughly, executed—from *per*, thoroughly; *patro*, I perform: It. *perpetrare:* F. *perpétrer*]: to commit or perform, applied generally to an evil act—e.g., 'to perpetrate a crime;' sometimes humorously—e.g., 'to perpetrate a pun.' PER'PETRATING, imp. PER'PETRATED, pp. PER'PETRATOR, n. *-tėr*, one who performs or commits an act, usually evil. PER'PETRA'TION, n. *-trā'-shŭn*, act of performing or committing, as above.

PERPET'UAL CURE: form of English ecclesiastical benefice which grew out of the abuse of lay Impropriation (q.v.), the impropriator appointing a clergyman to discharge the spiritual functions of which he himself was not capable. The substituted clergyman, in ordinary cases, is appointed by the bishop, and called a vicar; but when no provision is made for a vicar, the impropriator appoints the clergyman, who is called a perpetual curate. The perpetual curate enters on his office without induction or institution, and requires only the bishop's license. Perpetual cures are also created by the erection and endowment of a chapel subject to the principal church of a parish. Such cures, however, are not benefices, unless endowed out of the fund called Queen Anne's Bounty. The district churches erected under several recent acts are made perpetual cures, and their incumbents are corporations

PERPETUAL MOTION, The: term denoting a machine whose motion would continue forever, or till the parts of the machine were worn out. According to Newton's First Law (see Motion, Laws of), all unresisted motion continues forever unchanged. Thus, *if friction could be avoided*, a top or a gyroscope spinning in vacuo is an instance of motion which would be unchanged forever, and which, therefore, might be called perpetual. The motion of the sun in space, the earth's rotation about its axis, and numerous other common motions, are in this popular sense perpetual. It is necessary to remark here, that even these motions are subject to retardation; for instance, those of the bodies of the solar system, by the resistance of the luminiferous medium, which is now supposed to fill all space. This was remarked by Newton himself, for he says, 'the larger bodies, planets and comets, preserve their motions longer (than terrestrial objects), because they move in less resisting media.' The same cause influences the motion of the gyroscope, but in its case there is another retarding influence at work, due to the production of electric currents by the magnetism of the earth. But this is not what is technically understood by the title *The Perpetual Motion*, which denotes a mechanical construction that, without any supply of power from without, can not only maintain its own motion forever, or as long as its materials last, but can also be applied to drive machinery, and therefore to do external work. In other words, it means a device for creating power or energy without corresponding expenditure. This is now known to be absolutely impossible, whatever physical forces may be employed. In fact, the modern physical axiom, the Conservation of Energy (see Force) founded on experimental bases as certain as those which convince us of the truth of the Laws of Motion, may be expressed, in the negative, thus: *The perpetual motion is impossible.* Helmholtz's beautiful investigations regarding Conservation of Energy (referred to in Force) are founded on this axiom. So is the recent application, by Clausius, of Carnot's remarkable investigation of the 'Motive-power of Fire' to the true Theory of Heat. See other instances at the end of the article.

The complete statement of the impossibility of procuring the P. M. with the ordinary mechanical arrangements, in which it was most commonly sought, is in the *Principia*, as a deduction from Newton's Third Law of Motion. The equivalent principle of Conservation of Energy is there stated in a manner which leaves nothing to be desired; though not given in anything like the modern phraseology. Yet it is usually said, in works on the P. M., that De La Hire (1678) gave the first proof of its impossibility in ordinary mechanics. This proof, published long after Newton's, is by no means so complete, as it exposes only some of the more patent absurdities which had been propounded for the solution of the problem. It is certain, and worthy of particular no-

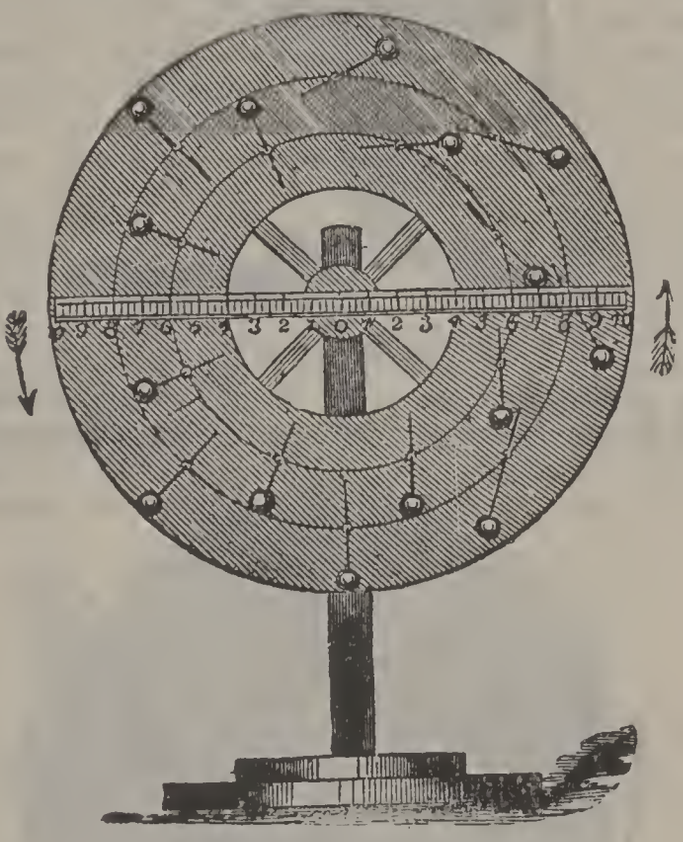
tice, that Newton was far in advance of the greatest of his contemporaries and their immediate successors, in even the fundamental notions of mechanics. Thus, we find John Bernouilli seriously propounding a form of the P. M., depending on the alternate mixture, and separation by a filter, of two liquids of different densities; an arrangement as preposterous as the very common suggestion of a water-wheel which should pump up its own supply of water; and whose absurdity must be evident to any one acquainted with Newton's chapter on the Laws of Motion. It is curious that, long before Newton's time, the physical axiom, that the P. M. is impossible, was assumed by Stevinus as a foundation for the science of Statics. This is particularly interesting when we compare it with the magnificent discoveries which have been evolved in our own day from the same principle applied to the physical forces generally, and not to gravitation alone, as contemplated by Stevinus. His process is as follows: Let an endless chain of uniform weight be passed round a smooth triangular prism ABC, of which the face BC is horizontal. The free portion of the chain, BDC, will hang in a symmetrical curve (CATENARY, q.v.), and its tension will therefore be the same at B and at C. Hence the other portion, BAC, of the chain will be free to move, unless the resolved part of the weight of AB, acting down the inclined plane AB, just balance that of the corresponding portion of the chain down AC. If these balance, the parallelogram of forces is proved; if not, one side will preponderate, and we shall evidently obtain the P. M. We briefly sketch the history of the simpler part of the problem, where mechanical and hydrostatical arrangements alone are contemplated, and where the impossibility of procuring the P. M. had been shown by Newton.



The leading features of the various devices suggested as self-moving engines are three: 1. The machine, being a combination of mechanical powers driven by weights, was to be constructed so as constantly to wind up those weights as they fell, and therefore to be constantly in the same circumstances as to power in each successive complete revolution. The ideal of this, in its simplest form, is that of a wheel moving about a horizontal axis, and so adjusting certain heavy sliding pieces, on its surface, as to have always a preponderance on one particular side. 2. The type of the second class differs from that of the first only in the substitution of liquids for the weights in the first class, and the consequent introduction (often in most extravagant forms) of hydrostatical laws, which the inventors seem to have considered less certain and more pliable than the stern facts of common mechanics. 3. The machine depends on some natural power, such as rain, change of temperature, wind,

fluctuations of the barometer, tides, etc. The consideration of this third class is very interesting, but we will defer it for a little.

Of the first class, the only machines that seem ever to have succeeded in permanently deceiving any but their inventors are those of the Marquis of Worcester and of Councilor Orffyreus. Contemporary with the former was Bp. Wilkins, who candidly and ingeniously points out the fallacies of various devices of his own, depending severally on weights, on magnets, and on Archimedes's screw. His first attempt seems to have been closely allied to that of the Marquis of Worcester, of whose engine we have no drawing, and only a very vague description. The following figures give us, however, some no-

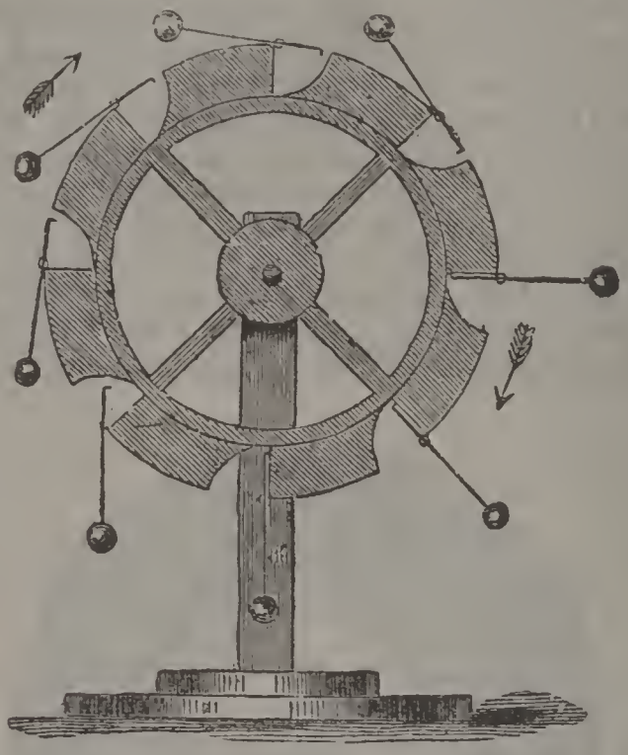


Bishop Wilkins's First Form.

tion of its probable nature. The first is one of Wilkins's, the second that of Jackson, the third that of Merlin. Their construction is evident from the figures.

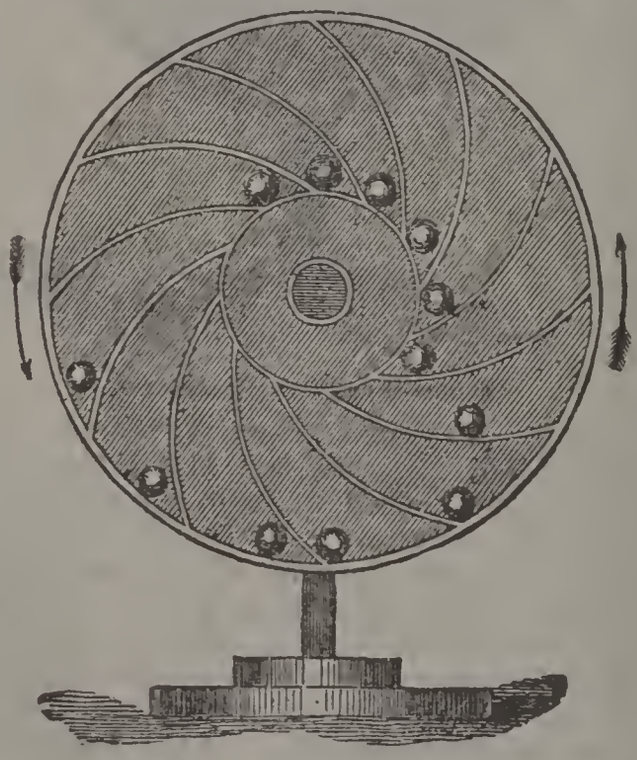
In all three, the attempt is by the sliding of the balls in their cells, or by the turning of the levers, to give the preponderance to the descending side of the wheel. But even the cuts show that, though the weights on the descending side are on the whole further from the axis of the wheel than those on the ascending side, yet *there are more balls* on the latter than on the former side; and a careful examination, like that made by Wilkins, shows that their moments in opposite directions about the axis balance each other. With reference to the invention of the Marquis of Worcester—otherwise well known as one of the first to foresee, and even in part to

realize experimentally, the advantage of steam as a motive-power—we find the following in his *Century of Inventions:* '*An Advantageous Change of Centers.*—To



Jackson's Perpetual Motion.

prouide and make that all ye weights of ye descending syde of a wheele shal be perpetually further from ye



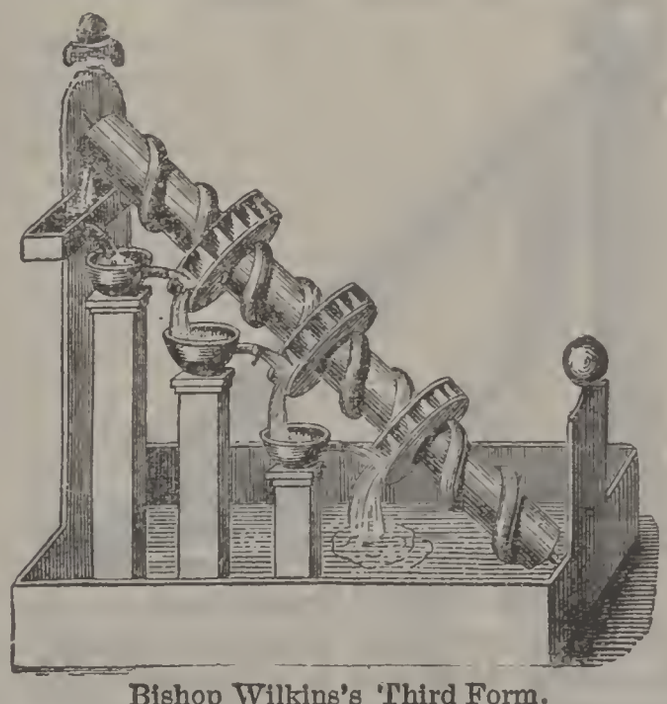
Merlin's Perpetual Motion.

center, then those of ye mounting syde, and yett equall in number and heft of ye one syde as ye other. A most incredible thing if not seene, butt tryed before ye late

King of happy and glorious memorye in y^e^ Tower by my directions, two Extraordnary Embassadors accompanying his Ma^tie^ and y^e^ D. of Richmond, D. Hamilton, and most part of y^e^ Court attending him. The wheele was 14 foote ouer, and 40 weights of 50 p^d^ apiece; S^r^ Wm. Belford, then Lieu^t^ of y^e^ Tower, and yet liuing can justify it with seuerall others; They all saw that noe sooner these great weights passed y^e^ Diameter Line of y^e^ vpper syde but they hung a foote further from y^e^ center, nor no sooner passed the Diameter Line of the lower syde, butt they hung a foote nearer; bee pleased to judge y^e^ consequence' (see Harleian MS., No. 2428, Brit. Museum).

The machine of Orffyreus, by which 'S Gravesande was completely deceived, so much so that he wrote to Newton expressing his belief that the P. M. was really found, consisted of a large wheel or drum covered with canvas, to prevent the interior from being seen, and rotating about a thick horizontal axle. This machine, when set agoing in either direction, moved with accelerated speed till it reached a rate of 25 turns in a minute; and on one occasion was sealed up by the elector of Cassel for two months, and at the expiration of that time found to be moving as rapidly as ever. This, like the celebrated automaton chess-player, was evidently a case of clever imposition; and but for its strange effect on 'S Gravesande, would probably have been forgotton long ago. Another ingenious trick was that of Spence of Linlithgow (1818).

Bp. Wilkins's third form is a good example of the second class of contrivances above mentioned. Its construction may be understood from the annexed cut. The

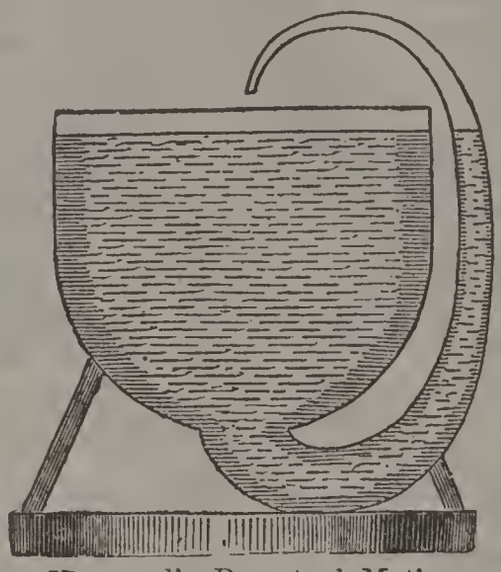


Bishop Wilkins's 'Third Form.

water-wheels, driven by the descending water, are intended to turn the Archimedean screw, so as constantly to replenish the tank above. Wilkins's calm investiga-

tion of the reasons why his device will not succeed is very interesting and creditable.

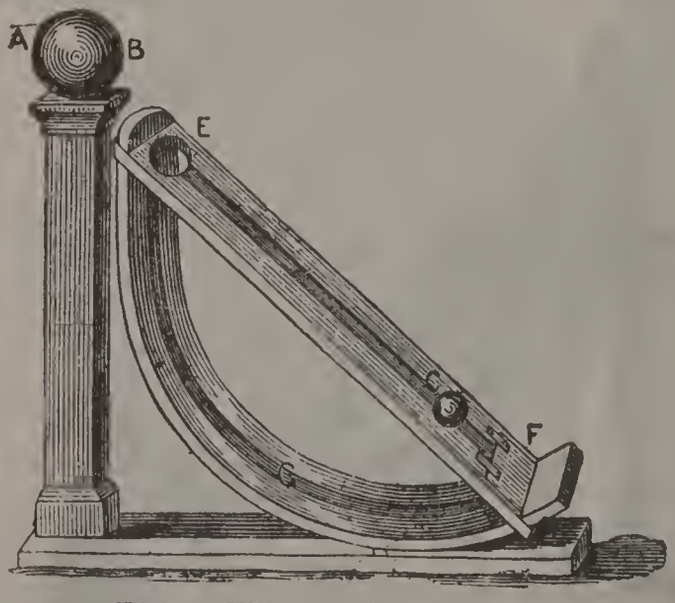
As a contrast, let us take a case of special absurdity, that of Norwood. In the figure, it is supposed that, as the weight of the water or mercury in the large vessel



Norwood's Perpetual Motion.

immensely exceeds that in the neck, it will preponderate, and drive the liquid through the spout into the vessel again; thereby furnishing, not only an admirable perpetual motion, but a conclusive disproof of one of the fundamental laws of Hydrostatics.

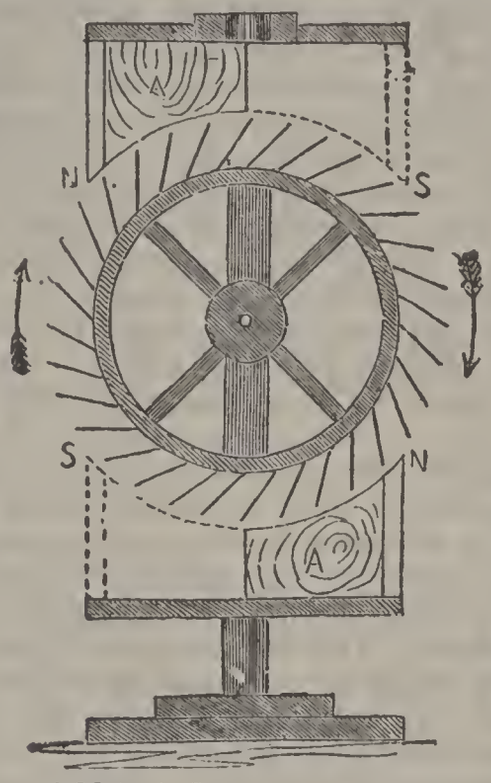
The second of Wilkins's cases is an instructive one. It depends on magnetism, and may be understood from the cut. AB is a loadstone, which draws the iron ball C up the inclined plane to E, where there is a hole



Bishop Wilkins's Second Form.

through which the ball falls down the curved incline, pushes open a trap at F, and is dragged again up the plane by the loadstone. The error of this is the neglect of the action of the loadstone on the falling ball. There would be an admirable case of the P. M. if we could remove or annihilate (without expenditure of work) the

action of the loadstone during the descent. But the law of magnetic attraction is the same as that of gravitation, and what is impossible with one must be equally so with the other. A good illustration of this is Addeley's P. M., represented in the annexed sketch. The spokes projecting from the wheel are magnets, whose s. poles are all turned from the centre. These are attracted by the n. poles (N), and repelled by the s. poles (S), of four



Addeley's Perpetual Motion.

fixed magnets; and blocks of *wood* (A) are interposed, to *prevent* magnetic action where it would tend to stop the machine! If it were possible to find a substance which would deal with gravitation or magnetism as an opaque body does with light (casting a shadow), the P. M. would be obtained with the greatest ease.

We merely glance at magneto-electric machines turned by electro-magnetic engines, to which they supply the electric currents; electric machines, driven by a gas-engine, the fuel for which is supplied by the decomposition of water by the electricity produced, etc.; the absurdity of all of which may be imagined from the perfectly analogous case of a steam-engine to which heat might be supposed to be supplied by the friction of bodies driven by the engine itself. An excellent example of this absurdity is furnished by the writings of one of the ablest of geologists. He considers that the internal heat of the earth may be due to chemical combination, that the heat so produced may develop thermo-electric currents, and that these in their turn may decompose the compounds formed, so that the process may go on indefinitely.

But the third class of attempts above described merits a few words. It certainly does *not* give the P. M., but

it is capable of furnishing prime-movers which will work uninterruptedly for perhaps hundreds of thousands of years. This is done, however, as we should expect, at the expense of other stores of energy in the universe. Thus, the tide-wheel, or tidal engine, a little-used but most effective source of power, derives its energy entirely from the earth's diurnal rotation. Engines driven by collected rain-water, such as mill-wheels, etc., and others driven by power stored up from winds, etc., depend on energy radiated from the sun, mainly in the form of heat. None of these can, therefore, in strictness be called the P. M., since the energy of the earth's rotation, or of the sun's heat, is drawn upon in their production.

But the complete proof of the impossibility of procuring the P. M. by any arrangement whatever, involving any known forces, was arrived at mainly by the experiments of Joule (q.v.), who showed that the principle of the Conservation of Energy extends, not alone to the forces for which it was enunciated by Newton, but to every known form of physical action. The date 1840–45 may thus be said to have finally settled this long-disputed question; at all events, until new forms of physical forces shall be discovered; and we are now in a position to do generally what was wisely done by the French Acad. 1775 for ordinary mechanical contrivances alone—viz., refuse to consider any scheme whatever which pretends to give work without corresponding and equivalent expenditure. The language in which this decision of the French Acad. is recorded (*Histoire de l'Académie*, 1775) is worthy of being quoted, for its calm scientific clearness and brevity, and for its present applicability to physical science in general: 'The construction of a P. M. is impossible. Even if the effect of the motive-power were not in the long run destroyed by friction and the resistance of the medium [in which the motion takes place], this power could produce merely an effect equivalent to itself. In order, therefore, to produce a perpetual effect from a finite cause, that effect must be infinitely small in any finite time. Neglecting friction and resistance, a body to which motion has been given will retain it forever; but only on condition of its not acting on other bodies; and the only P. M. possible, on this hypothesis (which, besides, cannot occur in nature), would be useless for the object which the devisers of perpetual motions have in view. This species of research has the inconvenience of being costly; it has ruined many a family; and numerous mechanics, who might have done great service, have wasted on it their means, their time, and their talents. These are the principal motives which have led the Academy to its decision. In resolving that it will no longer notice such speculations, it simply declares its opinion of the uselessness of the labors of those who are devoted to them.'

It has been asserted that the infatuation of the perpetual motionists, who (as may be seen by a glance at the specifications of patents in Britain, France, Bel

gium, the United States, etc.) are perhaps more numerous now than ever, is due to two causes—one, the idea that the P. M. is a lost but recoverable invention; the other, that some immense govt. reward has been for years laid aside for the successful discoverer. These notions are as fallacious as the grand delusion itself.

A few of the cases above hinted at, in which the impossibility of the P. M. formed the basis of an investigation, will show the great use which may be made of even a negative proposition. Helmholtz has shown from it that the ultimate particles of matter must exert on each other forces, whose direction is that of the line joining each pair of particles, and whose magnitude depends solely on their distance. J. Thomson employed it to show that the freezing-point of water is lowered by pressure, as otherwise work might be created by the freezing of ice-cold water. W. Thomson has employed it to show that a diamagnetic (see DIAMAGNETISM) body does *not* take the opposite magnetism to iron, when in similar circumstances; for if it did, and if, like iron, it took time for the full development of the action, a P. M. might be produced.

The literature of this subject is extensive, but scattered mainly through Patent Records and ephemeral pamphlets. The *Journal des Savants* and Montucla's *Histoire des Mathématiques* may be consulted; but the curious are referred especially to an interesting work by Dircks (of Patent-Ghost notoriety) entitled *Perpetuum Mobile* (Spon, London 1861): to which this article is indebted for some historical notices. The tenor of the work is such that it is not easily discovered whether the author is a perpetual-motionist or not; however this may be, it is extremely complete and interesting as a history.

PERPETUATE, v. *pėr-pĕt′ū-āt* [L. *perpetŭātus*, proceeded with continually—from *perpetuus*, perpetual: It. *perpetuāre:* F. *perpétuer*]: to cause to be continued indefinitely; to preserve from extinction or oblivion. PERPET′UATING, imp. PERPET′UATED, pp. PERPET′UA′TIÒN, n. *-ā′shŭn* [F.—L.]. the act of making perpetual; incessant continuance. PERPET′UAL, a. *-ăl* [F. *perpétuel*]: never-ceasing; continuing without intermission; permanent; not temporary; endless. PERPET′UALLY, ad. *-lĭ*. PERPETUAL CURACY, in the Anglican church, a living where all the tithes are appropriated and no vicarage endowed (see PERPETUAL CURE). PERPETUAL SCREW, a screw that continues acting without intermission against the teeth of a wheel so long as the moving power continues; an endless screw. PERPETUITY, n. *pėr′pĕ-tū′ĭ-tĭ* [F. *perpétuité*—from L. *perpetu′ĭtātem*]: endless duration; continued and uninterrupted existence for an indefinite period of time; something of which there is no end.—SYN. of 'perpetual': continual; continuous; unceasing; incessant; constant; lasting; everlasting; eternal; perennial; never-failing.

PERPETU'ITIES, Law against: rule adopted in England to the effect that property cannot be tied up for a period longer than the lives of some parties already in existence, and 21 years more. Those who have the power of disposing of their property have often attempted to regulate the succession of their estate at distant periods. Such was the object of the original practice of entailing property, and so enforcing the devolution of property on a certain series of heirs to the remotest generations. This power of testators was always looked on with jealousy, as tending to embarrass future dealings with the property, and frustrate the purposes for which property is established. So early as the reign of Edward IV., a decision was reached by the courts in Taltarum's case, which had the effect of allowing the first tenant in tail in remainder, on arriving at majority, to disentail the estate at discretion. Hence, in England, there has been ever since no mode of settling property in any way so as to tie it up beyond the life of the first who takes an estate of freehold, and the nonage of the tenant in tail next in remainder—i.e., the lives of persons in existence, and 21 years more. This principle applies not only to land, but to personal property. As to the accumulation of the income of property, an attempt was made by Mr. Thellusson to create an immense fortune by directing the income of his property to be accumulated during the lives of all his children, grandchildren, and great-grandchildren, who were living at the time of his death, for the benefit of some future descendants, to be living at the death of the survivor. The probable amount of the accumulated fund was expected to be 19 millions sterling (more than $90,000,000). The will was in great measure defeated by the existing law; but in consequence of so conspicuous an attempt, an act of parliament was passed, called the Thellusson Act (39 and 40 Geo. III. c. 98), which in future forbids the accumulation of income for any longer time than the life of the granter or settler, or 21 years from his death. See Entail.—In the United States, the statutes of the various states providing for limitation of perpetuities are in general similar to those in England. It is recognized as against public policy to allow any person to tie up property beyond a reasonable time.

PERPIGNAN, *pĕr-pēn-yŏng':* town of France, and fortress of the first rank, cap. of the dept. of Pyrénées-Orientales; on the right bank of the river Tet, 5 m. from the Mediterranean, 40 m. by railway s. of Narbonne. It commands the passage by the e. Pyrenees from Spain into France, and is defended on the s. by a citadel and by ramparts flanked with bastions, and protected by raised works. The works underwent thorough repair 1823, and P. now ranks as one of the first strongholds in France. Its appearance is exceedingly picturesque. From a distance, its houses are seen in the midst of a forest of orchards; and a closer examination shows a collection of narrow streets, covered with awnings,

houses of semi-Moresque construction, with wooden balconies and courts, and other evidences of Spanish influence. The cathedral, a massive building, begun 1324, the belfry of St. Jacques, and the Castiller (now used as a military prison), with its battlements and machicolations, give character to the town. P. contains barracks for 5,000 men, a council-house, palace of justice, mint, a college, numerous schools, museums, and scientific societies. Good *vin ordinaire* (red) is grown in the vicinity; woolen cloths, playing-cards, leather, etc., are manufactured, and there is trade in wine, brandy, wool, cork-bark, and silk.

P., as cap. of the former county of Roussillon, remained long in the hands of the kings of Aragon, and 1349 King Pedro founded a university here. In 1642 it was taken by Louis XIII.; and since that time, the town itself, together with the county of Roussillon, has remained in the possession of the French.—Pop. (1872) 20,011: (1881) 24,959; (1891) 33,878; (1901) 36,157.

PERPLEX, v. *pėr-plĕks'* [F. *perplexe*—from L. *perplexus*, very much entangled or twisted together—from *per*, thoroughly; *plexus*, twisted, interwoven; *plecto*, I plait]: to make intricate or difficult; to puzzle; to distract; to confuse; to distress with suspense or anxiety. PERPLEX'ING, imp.: ADJ. troublesome; embarrassing. PERPLEXED', pp. *-plĕkst':* ADJ. entangled; embarrassed; puzzled. PERPLEX'EDLY, ad. *-ĕd-lĭ.* PERPLEX'EDNESS, n. *-nĕs*, state of being perplexed; embarrassment. PERPLEX'ITY, n. *-ĭ-tĭ* [F. *perplexité*—from L.]: anxiety; intricacy; distraction of mind through doubt or difficulty. —SYN. of 'perplex': to embarrass; pose; entangle; involve; complicate; bewilder; harass; molest; vex; tease; plague.

PERQUISITE, n. *pėr'kwĭ-zĭt* [L. *perquisītus*, made diligent search for; mid. L. *perquisītum*, anything purchased —from *per*, thoroughly; *quærĕrĕ*, to seek]: the incidental gains of an office or an employment over and above the settled wages. PER'QUISI'TION, n. *-zĭsh'ŭn* [F.—L.]: a thorough inquiry or search.

PERRAULT, *pā-rō'*, CHARLES: French writer: 1628, Jan. 12—1703, May 16; b. Paris; son of an advocate. In 1651 he became a member of the Paris bar; but through the minister Colbert, he was made controller-gen. of the royal buildings, and 1671 member of the French Acad. His famous controversy with Boileau regarding the comparative merits of the ancients and moderns, originated in his poem *Le Siècle de Louis le Grand*, read before his confrères of the Acad., seeking to prove modern authors superior to Homer, Herodotus, Plato, Aristotle, Virgil, etc. His elaborate and learned *Parallèle des Anciens et des Modernes* (4 vols. 1688–98) completely fails in its logic. Boileau was his keenest opponent, and fiercely assailed him in *Réflexions sur Longin*, to which P. replied with equal acrimony, but not equal wit, in *Apologie des Femmes* (1694). However this quarrel had one good

result, Perrault's admirable work, *Hommes Illustres du Siècle de Louis XIV.*, containing 200 critical biographies. But the work that has given him high repute is *Contes des Fées*, or Fairy Tales. (See NOVELS.) The grace, liveliness, and ingenious child-like fancy of these charming compositions, written in Perrault's advanced age, give them rank above all other fairy tales.

PER'RIN, BERNADOTTE, PH.D., LL.D.: American educator: b. Goshen, Conn., 1847, Sept. 15. He was graduated from Yale in 1869, studied in the universities of Leipsic, Tübingen, and Berlin, and in 1881–93 was professor of Greek in Western Reserve University, since when he has occupied that chair at Yale. He has written extensively on Greek and Roman history, and has edited many text-books, among them are: *Cæsar's Civil War* (1882); *School Odyessey*, 8 vols. and vocab. (1897); *Plutarch's Greek Lives* (1901); *etc.* He is associate editor of the *Twentieth Century Series of Text-Books.*

PERRON, n. *pĕr'rŏn* [F. *perron*—from *pierre*, a stone: L. and Gr. *petra*, a rock, a stone]: a staircase or flight of steps outside a building.

PERRON', ANQUETIL DU. See ANQUETIL-DUPERRON.

PERRONE, *pĕr-rō'nā*, GIOVANNI: 1794–1876, Aug. 29; b. Chieri, Piedmont. He graduated as doctor of theology at Turin University, and entered the Society of Jesuits, Rome, 1815. He became professor of theology in the Roman Coll. 1823, which position he held till the suppression of the Jesuit houses 1873, except during his service as rector in the College of Ferrara, 1830–33, and in the Roman College 1853–56. In 1848 he took refuge in England with some of his pupils, and opened a course at Stonyhurst for them and English Jesuits. He returned to Rome 1850. He was the great Roman Catholic teacher of the 19th century, his lectures on theology after 1835 having supplanted all others in nearly all the Roman Catholic schools of the world. He published more than 60 different works, the principal being *Prælectiones Theologicæ* (9 vols. 1835; 31st ed. 1865), and the same abridged (4 vols., 1845; 36th ed. 2 vols. 1881); *Il Protestantismo e la regola di fede* (1853); *De Domini Nostri Jesu Christi Divinitate* (1870); *De Romani Pontificis Infallibilitate* (1874).

PERRUQUE, n. *pĕr-rôk'* [F. *perruque*—from It. *parruca*, a wig: perhaps connected with L. *pellucus*—from *pellis*, a skin]: a wig. PERRUQUIER, n. *pĕr-rô'kĭ-ĕr* [F.]: a wig-maker.

PERRY, n. *pĕr'rĭ* [F. *poire*, a pear; *poiré*, perry—from L. *pirum*, a pear]: the fermented juice of pears, a beverage containing 5 to 9 per cent. of alcohol. It is usually made best from the pears least attractive for eating.

PERRY, *pĕr'rĭ*, ARTHUR LATHAM, D.D., LL.D.: political economist: b. Lyme, N. H., 1830, Feb. 27; d. Williamstown, Mass., 1905, July 9. He was graduated from Williams College in 1852, and became professor of his-

tory and political economy there in 1853, which position he held till 1891, when he was made professor emeritus. He published *The Elements of Political Economy* (1865), a work which passed through 20 editions; *Introduction to Political Economy* (1877); *Principles of Political Economy* (1891); *Williamstown and Williams College* (1900).

PERRY, Bliss, L.H.D., LITT.D., LL.D.: American educator and editor: b. Williamstown, Mass., 1860, Nov. 25. He is a son of A. L. Perry (q.v.), was graduated from Williams College in 1881 and was professor of English there 1886–93. He was professor of oratory and æsthetic criticism at Princeton University (1893–9); resigning to become editor of the *Atlantic Monthly*, which post he now holds. He has published *The Broughton House* (1890); *Salem Kittredge, and Other Stories* (1894); *The Plated City* (1895); *The Powers at Play* (1899); *A Study of Prose Fiction* (1902); *The Amateur Spirit* (1904); *Walt Whitman* (1906); *Whittier* (1907); etc. He has also edited *Selections from Burke; Scott's Woodstock and Ivanhoe;* and *Little Masterpieces* (18 vols.)

PER'RY, Christopher Raymond: 1761, Dec. 4—1818, June 1; b. Newport, R. I. He enlisted in the colonial army, afterward serving on privateers and in the Amer. navy during the revolution. He was twice captured, and was imprisoned in the famous prison-ship *Jersey*, from which he escaped, and returned to the mercantile marine. War with France seeming imminent, he was made post-captain, U.S.N. 1798, Jan. 9. While cruising in the West Indies he co-operated with Toussant L'Ouverture in the civil war in San Domingo. On the practical disbandment of the navy 1801, he was appointed collector of Newport, where he died several years after his retirement to private life.

PER'RY, Matthew Calbraith: 1794, Apr. 10—1858, Mar. 4; b. S. Kingston, R. I.; bro. of Oliver Hazard Perry. He entered the U. S. navy as midshipman 1809, Jan. 16, serving under his brother Oliver, and afterward under Commodores Rodgers and Decatur, in the war of 1812. He was promoted lieutenant 1813, Feb. 27; and 1819, as executive officer of the *Cyane*, took the first colony of negroes from the United States to Africa, fixing the locality of Monrovia 1821. Under Commodore David Porter in the West Indies 1822 he captured several pirate vessels. He was made commander 1826, Mar. 21, captain 1837, Feb. 9. He served many years on foreign stations, especially the Mediterranean, where he protected American commerce from Greek pirates. In 1829 he took John Randolph as envoy to the czar in the first American man-of-war entering Russian waters. In a private audience, Czar Nicholas tendered him high rank in the Russian navy, which he declined. He also exchanged courtesies with Mehemet Ali, founder of the khedival dynasty of Egypt. During ten years of duty

as master-commandant at the Brooklyn navy-yard, beginning 1833, Jan. 7, he gave much attention to the study and application of naval science with excellent results to the U. S. navy, organizing the first steam service, and 1838–40 commanding the first steam war-vessel of our navy, the *Fulton II.* He commanded the w. African squadron 1843–45, enforcing the Webster-Ashburton treaty; and in the Mexican war was in charge of the steam navy, assisted at the siege of Vera Cruz, captured Laguna, Tabasco, and Tuspan; and blockaded the coast, holding every important place until the end of the war. He organized and commanded the expedition to Japan 1853–4, and by skilful negotiation opened that country to foreign commerce. In the fishery disputes with Canada, he visited Newfoundland and helped to bring about the reciprocity treaty of 1854.

PERRY, Nora: American poet and prose writer: b. Dudley, Mass., 1832; d. there 1896, May 13. She was for several years the Boston correspondent of the Chicago *Tribune* and the Providence *Journal*, but in her later years her writing was principally confined to stories for girls, in which field she was particularly successful, her books of this description being marked by lively narrative and attractive character study. It is as a poet, however, that she will be longest recalled, the earliest of her poems to attract attention being the graceful lyric *Tying Her Bonnet Under Her Chin.* Another popular poem by her was *After the Ball.* Her published books include *After the Ball and Other Poems* (1874); *Her Lover's Friend, verse* (1879); *The Tragedy of the Unexpected and Other Stories* (1880); *Book of Love Stories* (1881); *For a Woman*, a novel (1885); *New Songs and Ballads* (1886); *A Flock of Girls* (1887); *Lyrics and Legends* (1890); *Hope Benham* (1894); *The Youngest Miss Lorton; Those Little Daughters of the Revolution* (1896).

PERRY, Oliver Hazard: 1785, Aug. 23—1819, Aug. 23; b. S. Kingston, R. I.; son of Christopher Raymond Perry. He was commissioned midshipman 1799, Apr. 7; served in the war against Tripoli, and was made lieutenant 1807, Jan. 15. He became one of the best ordnance officers in the U. S. navy. He was transferred to service under Com. Isaac Chauncey on Lake Ontario, 1813, Feb., and participated in the attack on Ft. George. On being appointed to fit out a squadron on Lake Erie, he proceeded to Presque Isle (now Erie), Penn., where he equipped 9 small vessels, with which he attacked and captured the British fleet near Put-in-Bay, O., 1813, Sep. 15. He reported this victory to Gen. William H. Harrison in the memorable dispatch. 'We have met the enemy and they are ours.' His success won him the thanks of congress, a medal, and the rank of capt. He co-operated with Gen. Harrison at Detroit and the battle of the Thames, 1813, Oct. 15; assisted in the de-

fense of Baltimore; and commanded the *Java* in the Mediterranean squadron 1815. While in command of U. S. vessels in the West Indies, he was attacked with yellow fever, and died at Port Spain, Trinidad. By act of congress, his remains were removed in a ship-of-war and buried at Newport, 1826, Dec. 4. A granite obelisk was erected by the state of Rhode Island, and a bronze statue erected by the citizens of Newport was unveiled 1885, Sep. 10.

PERRY, William Stevens, s.t.d., ll.d.: Prot. Episc. bishop of Iowa; b. Providence, R. I., 1832, Jan. 22; d. Dubuque, Iowa, 1898, May 13; graduated at Harvard 1854. He was minister of churches in Newton, Mass., Boston, Nashua, N. H., Portland, Me., Litchfield, Conn., and Geneva, N. Y.; professor of history in Hobart College at Geneva 1871–3, and for a while president. From 1876, he was Prot. Episc. bishop of Iowa. Among his numerous books are many pertaining to the early hist. of the Prot. Episc. Chh. in America; also a history of the same 1587–1883, 2 vols.; *Some Summer Days Abroad* (1880); *Life Lessons from the Book of Proverbs*, (4th ed. 1885); a vol. of sermons (1885); and 12 episcopal addresses (1888).

PER'SEA. See Avocado.

PERSECUTE, v. *pėr'sĕ-kūt* [F. *persécuter*, to persecute—from L. *persĕcūtus*, followed perseveringly—from *per*, thoroughly; *secūtus*, followed, pursued; *sequi*, to follow]: to pursue closely or harassingly; to afflict or harass on account of religion; to pursue with continued malignity; to harass or annoy with solicitation or importunity. Per'secuting, inp. a. harassing or afflicting unjustly, particularly for religious opinions; pursuing with enmity in order to injure in person or means. Per'secuted, pp. a. harassed and afflicted by the enmity of another. Per'secutor, n. *-kū-tėr*, one who persecutes; one who pursues and harasses another unjustly. Per'secu'tion, n. *-kū'shŭn* [F.—L.]: the act of harassing or punishing another unjustly; the act of afflicting or destroying on account of adherence to a particular creed. Per'secu'tive, a. *-kū'tĭv*, following; persecuting.

PERSECU'TIONS, The Ten, of the early Christian Church: denoting in ecclesiastical history certain periods of special severity exercised toward the rising community of Christians, to compel them to renounce their new creed and conform to the established religion of the empire. The Christian community were at all times regarded with suspicion and dislike in the Roman empire —the constitution of Rome being not only essentially intolerant of new religions which, like the Christian, were directly aggressive against the established paganism of the state, but being also particularly hostile to private associations and private assemblages for worship, such as those which every Christian congregation by its very

nature presented: thus there are in the first three centuries very few periods in which the church had everywhere immunity from persecution. But the name denotes specifically certain periods when either new enactments were passed against Christianity, or the existing ones were enforced with unusual rigor. The notion of *ten* such periods is commonly accepted almost as an historical axiom; but this precise determination of the number is comparatively recent. In the 4th c., no settled theory of the number of persecutions seems to have been adopted. Lactantius reckons but six; Eusebius does not state the number, though his narrative supplies data for nine. Sulpicius Severus, 5th c., is the first who expressly states the number at *ten;* but he enumerates only nine in detail, and in completing the number to ten, he adds the general persecution which, at the coming of Antichrist, is to precede the end of the world. The fixing of ten as the number seems to have originated in a mystic allusion to the ten horns of the beast in the Apocalypse (Rev. xvii. 12).

This however is a question only of words, the diversity of enumeration arising from different notions attached by the several historians to the designation *general.* If taken strictly to comprise the entire Roman empire, the number must fall below ten; if used more loosely of local persecutions, the number might be very largely increased. The ten commonly regarded as general are the following: under Nero, 64; under Domitian, 95; under Trajan, 107; under Hadrian, 125; under Marcus Aurelius, 165; under Septimius Severus, 202; under Maximinus, 235; under Decius, 249; under Valerianus, 257; under Diocletian, 303. The extent and the duration of some of these, and the total number of victims in the pagan persecutions of the church, have been the subject of considerable controversy. It is quite certain that there have been exaggerations on the Christian as well as on the adverse side; but it has been shown beyond possibility of doubt, and the most recent explorations have confirmed the arguments, that the data on which were founded the estimates of Dodwell and Gibbon, the most prominent advocates of the theory of the small number, were fallacious; and that, not including the many victims of the constantly recurring local violences, the number who fell in each of the above-named persecutions was both large in itself, and spread, in most cases, over a considerable extent of the Roman empire. The most violent, as well as the most widely-spread persecutions, were under Nero, Trajan, Maximinus, Decius, and Diocletian. The last was in reality far less the work of Diocletian than of his colleague Galerius; but it was extremely cruel, and, with occasional interruptions, continued from 303 to the victory of Constantine over Maxentius—nearly ten years.

PERSEPH'ONE: see PROSERPINA.

PERSEPOLIS, *pėr-sĕp′ō-lĭs* (Persian City), Greek translation of the lost name of the cap. of anc. Persia (*Parsa-Karta?*): on the river Araxes (Bendemir), e. of the river Medus (Polwat, or River of Murghab), in the plain of Merdusht, about 35 m. n.e. of Shiraz, on the road to

Ruins of Persepolis.
(Copied from Fergusson's *Palaces of Nineveh and Persepolis Restored.*)

Ispahan. A number of most remarkable ruins is all that remains of that city, with which, according to anc. writers, 'no other city could be compared either in beauty or in wealth,' and which was generally designated 'The Glory of the East.' Darius Hystaspes, Xerxes, Artaxerxes, and other Achæmenides, each in turn contributed to its aggrandizement. Alexander the Great, in his march of conquest, is said to have destroyed P. completely; but this probably must be understood to apply only to some of the chief palaces. It may also be presumed that after the fall of the Achæmenides, that extension of the original town (afterward known, and important in history till a recent period, as Istakhar), in which were the royal edifices and temples used as the royal treasuries till the time of Epiphanes, gradually fell into decay. The situation of these structures, overlooking the vast luxuriant plain of Merdusht, is described in terms of rapturous enthusiasm by every traveller from Chardin to our own day. Three groups are chiefly distinguishable in the vast ruins. First, the Chehel Minâr (Forty Pillars), with the Mountain of the Tombs (Rachmed), called also Takht-i-Jamshîd, or the structure of Jamshîd, after some fabulous ancient king, popularly supposed to be the founder of Persepolis. The next in order is Naksh-i-Rustam, to the n.w., with its tombs; and the last, the building called the Haram of Jamshîd. The most important is the first group, on a vast terrace of cyclopean masonry at the foot of a lofty mountain-range. The extent of this terrace is about 1,500 ft. n. by s., and about 800 e. by w.; and it was, according to Diodorus Siculus, surrounded by a triple wall of 16, 32, and 60 cubits respectively in height, for the triple purpose of giving strength, inspiring awe, and defense. The whole internal area is further divided into three terraces —the lowest toward the s.; the central 800 ft. square, 45

ft. above the plain; and the third, the northern, about 550 ft. long, and 35 ft. high. No traces of structures are found on the lowest platform; on the n., only the so-called 'Propylæa' of Xerxes; but the central platform seems to have been occupied by the foremost structures, which again, however, do not all appear to have stood on the same level. There are distinguished here the so-called 'Great Hall of Xerxes' (called Chehel Minâr, by way of eminence), the Palace of Xerxes, and the Palace of Darius, towering one above the other in successive elevation. The stone used for the buildings is dark-gray marble, cut into gigantic square blocks, and in many cases exquisitely polished. The ascent from the plain to the great n. platform is formed by two double flights, the steps of which are nearly 22 ft. wide, 3½ inches high, and 15 inches in the tread, so that several travellers have been able to ascend them on horseback. What are called the Propylæa of Xerxes on this platform are two masses of stone-work, which probably formed an entrance-gate-way for foot-passengers, paved with gigantic slabs of polished marble. Portals, still standing, bear figures of animals 15 ft. high, closely resembling the Assyrian bulls of Nineveh. The building itself, conjectured to have been a hall 82 ft. square, is, according to the cuneiform inscriptions, as interpreted by Rawlinson, the work of Xerxes; the inscription reads as follows:

'The great god Auramajda, he it is who has given this world, and who has given life to mankind, who has made Xerxes king, both king and lawgiver of the people. I am Xerxes the king, the great king, the king of kings, the king of the many-peopled countries, the supporter also of the great world, the son of King Darius, the Achæmenian.

'Says Xerxes the king, by the grace of Auramajda, I have made this gate of entrance; there is many another nobler work besides this Persepolis which I have executed, and which my father has executed;' etc.

An expanse of 162 ft. divides this platform from the central one, which still bears many of those columns of the Hall of Xerxes from which the ruins have taken their name. The staircase leading up to the Chehel Minâr, or Forty Pillars, is, if possible, more magnificent than the first; and the walls are more superbly decorated with sculptures, representing colossal warriors with spears, gigantic bulls, combats with wild beasts, processions, and the like; while broken capitals, shafts, pillars, and countless fragments of buildings, with cuneiform inscriptions, cover the whole vast space of this platform, 350 ft. from n. to s., and 380 from e. to w. The Great Hall of Xerxes, perhaps the largest and most magnificent structure that the world has ever seen, is computed to have been a rectangle of about 300–350 ft., and to have consequently covered 105,000 sq. ft., or 2½ acres. The pillars were arranged in four divisions, consisting of a centre group 6 deep every way, and an advanced body of 12 in two ranks, the same number flanking

the centre. 15 columns are all that remain of the number. Their form is very beautiful. Their height is 60 ft., circumference of the shaft 16, length from the capital to the torus, 44 ft. The shaft is finely fluted in 52 divisions; at its lower extremity begin a cincture and a torus, the first, two inches in depth, and the latter, 12 inches, whence devolves the pedestal, shaped like the cup and leaves of the pendent lotus, the capitals having been surmounted by the double semi-bull. Behind the Hall of Xerxes was the so-called Hall of Hundred Columns, s. of which are indications of another structure, which Fergusson terms the Central Edifice. Next along the w. front stood the Palace of Darius, and to the s. the Palace of Xerxes, about 86 ft. square, similarly decorated, and of similar grand proportions.—For more minute description, see travels of Niebuhr, Ker Porter, Rich, etc.; Fergusson's *Palaces of Nineveh and Persepolis Restored*, Vaux's *Nineveh and Persepolis*, and Rawlinson's *Five Great Monarchies*. See also PERSIAN ARCHITECTURE: CYRUS: DARIUS: XERXES: CUNEIFORM.

PERSEPOLITAN, a. *pėr-sē-pŏl'ĭ-tăn:* of or pertaining to the city of Persepolis, capital of ancient Persia: N. native or resident of Persepolis.

PER'SEUS, in Grecian Mythology: son of Zeus and Danaë (q.v.), and grandson of Acrisius. He was brought up at Seriphos, one of the Cyclades, where Polydectes reigned, who, wishing to rid himself of P. for private reasons, sent him, when a youth, to bring the head of the Gorgon Medusa, on the pretense that he wanted to present it as a bridal gift to Hippodamia. P. set forth under the protection of Athene and Hermes, the former of whom gave him a mirror, by which he could see the monster without looking at her (for that would have changed him into stone); the latter, a sickle; while the nymphs provided him with winged sandals, and a helmet of Hades, or invisible cap. After numerous wonderful adventures, he reached the abode of Medusa, who dwelt near Tartessus, on the coast of the ocean, and succeeded in cutting off her head, which he put into a bag, and carried off. On his return, he visited Ethiopia, where he liberated and married Andromeda, by whom he subsequently had numerous children, and arrived at Seriphos in time to rescue his mother from the annoyance of the too ardent addresses of Polydectes, whom with some of his companions P. changed into stone. After this, he went to Argos, from which Acrisius fled to Thessaly, and P. assumed the vacant throne. But this, like many other details of the myth, is differently narrated. P. was worshipped as a hero in various parts of Greece, and, according to Herodotus, in Egypt also. In anc. art, the figure of P. much resembles that of Hermes.—In anc. astronomy P. was represented in a northern constellation, holding in one hand the severed head of the Gorgon, and with the other hand waving a sword.

PERSEUS, *pėr'sūs* or *pėr'sē-ŭs*, or PERSES, *pėr'sēz*, last King of Macedonia: b. in the latter part of B.C. 3d c., died a few years later than B.C. 168; eldest son of Philip V. He was trained to a military life from his earliest years, and after bringing about the death of his younger brother, Demetrius, who was a favorite both with the Macedonians and with the Romans, he succeeded his father on the throne B.C. 179. Philip had long foreseen that a contest between Rome and Macedon was inevitable, and he had carefully prepared for it, so that P., on his accession, found himself fore-armed. Meanwhile, he governed Macedon with great prudence and moderation, and became popular with his subjects and neighbors. Seleucus IV. (Philopator) gave him his daughter Laodice in marriage; Prusias, the Bithynian king, married his sister; the Greek states looked favorably on his projects, and his envoys were well received even at Carthage. The Romans took the alarm, and—after some delusive negotiations—sent an army into Thessaly B.C. 171. The war lasted four years; in the first three, the advantages were so little on the side of the Romans, that there was a widespread feeling in P.'s favor in the countries bordering on the Levant and the Archipelago. In the beginning of the fourth campaign B.C. 168, L. Æmilius Paulus arrived, and took command of the Roman forces. A great battle was fought at Pydna (June 22), in which the army of P. was utterly routed. The king himself was soon afterward forced to surrender, and conveyed to Rome, where he adorned the triumph of the conqueror. He died in captivity at Alba.

PERSEVER'ANCE OF THE SAINTS: doctrine, one of the 'five points of Calvinism,' resulting logically from the essential parts of the Calvinistic system. As stated in the Westminster Confession of Faith it is that true Christian disciples, called and accepted of God, 'and sanctified by His Spirit, can neither totally nor finally fall away from the state of grace, but shall certainly persevere therein to the end and be eternally saved.' It is advocated not only by arguments from other doctrines, e.g., election, atonement, the intercession and mediatorial dominion of Christ, imputed righteousness, and regeneration, but also from many texts of Scripture, e.g., those which declare *eternal life* to be always connected with believing, and those which encourage the believer to depend on the faithfulness, love, and omnipotence of God. To an objection commonly urged against it, that it tends to make men careless concerning virtue and holiness, its advocates reply, that this objection is valid only against a doctrine very different from theirs—the true doctrine of final perseverance being one of perseverance in holiness, and giving no encouragement to a confidence of final salvation not connected with a present and even an increasing holiness. Arminians refuse to make so sweeping a statement as to the *impossibility* of falling from grace.

PERSEVERE, v. *pėr'sĕ-vēr'* [F. *persévérer*—from L. *persĕv'erārĕ*, to continue steadfastly, to persist—from *per*, thoroughly; *sevērus*, strict, severe: It. *perseverare*]: not to give over; to continue persistently in any business or enterprise undertaken; to pursue steadily a design or course begun; to be constant in effort or progress. PER'SEVE'RING, imp.: ADJ. constant in purpose or design; persistent. PER'SEVERED', pp. *-vērd'*. PER'SEVE'RINGLY, ad. *-lĭ*. PER'SEVE'RANCE, n. *-vē'răns* [F.—L.]: persistence in any design or attempt; constancy in pursuit or progress; in *theol.*, persistent continuance in the Christian character, and consequent favor of God—called also *final perseverance* (see above).—SYN. of 'perseverance': constancy; steadiness; persistence; steadfastness; continuance.

PERSIA, *pĕr'shĭ-a* [deemed by many scholars a corruption of *Arya*—Hellanicus gives *Aria* as a name of Persia, and Herodotus subsequently knew the Medians as the *Arii;* see Max Müller]: native name IRAN (see ARYAN RACE): the most extensive and powerful native kingdom of w. Asia; bounded n. by the great plain of Khiva, the Caspian Sea, and the Trans-Caucasian provinces of Russia; e. by Bokhara, Afghanistan, and Beloochistan; s. by the Strait of Ormuz and the Persian Gulf; and w. by Asiatic Turkey. It extends 900 m. from e. to w., and 700 m. from n. to s.; about 648,000 sq. m., about three times as large as France. It consists mostly of a great tableland, or elevated plateau, which in the centre and on its e. side is almost a level; but on the n., w., and s. is covered with mountain-chains. The province of Azerbijan, in the n.w., is almost wholly mountainous. From its s. boundary, the majestic range of the Elburz runs e., following the line of the Caspian coast at a distance varying from 12 to 60 m. At Astrabad, the mountains sink into ridges of lower elevation, one of which joins the Paropamisus in Afghanistan. A hill country lies n. of this line; it terminates in the Damani-koh chain, which sinks abruptly to the low plain of Turkestan. S. and e. of Azerbijan, a broad mountain-belt traverses P. from n.w. to s.e., the chains and valleys of which it consists lying in the same direction. To this region belong the mountains extending from Hamadan to Shiraz, many of whose peaks are clad with perpetual snow; and the Zagros Mountains and Pushti Kuh on the w. frontier. The Persian mountains are mostly primitive rock; granite, porphyry, felspar, and mountain-limestone enter largely into their composition. They show indications of volcanic action—Taftan, s. of Lake Zirreh, or Zamoon, being an active, and Demavend an extinct volcano; and the destructive earthquakes still frequent in n. and n.w. P., indicate the presence of subterranean fires. The Persian plateau, which lies in an angle between these mountains and spreads e. to the plateau of Afghanistan, ranges from 2,000 to 5,000 ft. above sea-level, the lowest portion being the Great Salt Desert in the s.w. of Khorassan, 2,000 ft. above sea-level; while the average elevation of the whole plateau above the sea is about 3,700 ft.

Almost the whole of Khorassan (q.v.), the n. half of Kerman (q.v.), the e. of Irak-Ajemi (q.v.), which form the great central plain, and detatched portions of all the other provinces, except those on the Caspian Sea, forming more than three-fourths of the surface of P., are desert. In parts of this waste, the surface is dry, and produces a scanty herbage of saline plants; in other parts, it is covered with salt marshes, or with a dry, hard, salt crust, sometimes of considerable thickness, which glitters and flashes in the sunlight, forcing the traveller on these inhospitable wastes to wear a shade to protect his eyes; but by far the greater portion of this region consists of sand, sometimes so light and im-

palpable as to be shifted hither and thither by the slightest breeze. This great central desert contains a few oases, but none of great extent. A narrow strip of low and level country extends along the shores of the Persian Gulf and the Strait of Ormuz. It consists of a succession of sandy plains, occasionally interrupted by a plantation of palms near the scanty rivulets which traverse it. It is called Dushtistan, or Gurmsir—that is, the warm region, in distinction from the mountainous districts, called Sirhud, or the cold country.

Although so much of P. is desert, parts of the country are of exceeding fertility and beauty: the immense valleys, some of them 100 m. in length, between the various ranges of the Kerman Mountains, abound in rare and valuable vegetable productions. Great portions of the provinces of Fars, Khuzistan, Ardelan, and Azerbijan have been lavishly endowed by nature with the most luxuriant vegetation; while the provinces of Ghilan and Mazanderan, between the Elburz and the Caspian Sea, and the s. slopes of the Elburz, are as beautiful as forest, water, and a hot climate can make them—the mountain-sides being clothed with trees and shrubs, and the plain, 300 m. long by 5 to 30 m. wide, studded with mulberry plantations, rice-fields, vineyards, orchards, orange-grounds, and sugar and cotton plantations.

Rivers.—P. has hardly a river properly termed navigable, though some of the rivers are several hundred m. in length, and of great width and volume. Among those noteworthy is the Karun, which rises in the mountains s. of Ispahan, and falls into the Shat-el-Arab, near Mohammerah. The rivers which flow southward receive, in the latter part of their course, few tributaries, and fertilize only a narrow strip of land on each side, except when their waters are applied by canals or other works to artificial irrigation of the soil. This mode of increasing and extending the productive powers of the country was much employed in ancient times; but the constant change of masters, and the never-ending disturbances under which P. has so long suffered, led to neglect of irrigation; and most of these monuments of the architectural skill and laborious industry of the ancient Persians are now ruinous.

Lakes.—P., as a natural consequence of the nature and situation of its surface, abounds in saline lakes, and nearly 30 of them have no visible outlets. The chief lake is Lake Oroomiah (q.v.), in Azerbijan. Lake Bakhtegan, in the e. of Fars, the receptacle for a drainage of the n. half of that province, is about 60 English m. in length by 9 in breadth. Lake Shiraz (q.v.) is much smaller. Part of Lake Zirreh is now included in the frontier of P., but it may still be considered as belonging chiefly to Afghanistan.

Climate and Products.—The climate is necessarily very varied. What the younger Cyrus is reported to have said to Xenophon regarding the climate, 'that people

perish with cold at one extremity, while they are suffocated with heat at the other,' is literally true. P. may be considered to possess three climates—that of the s. Dushtistan, of the elevated plateau, and of the Caspian provinces. In the Dushtistan, the autumnal heats are excessive, those of summer more tolerable, while in winter and spring the climate is delightful. On the plateau, the climate of Fars is temperate. About Ispahan, the winters and summers are equally mild, and the regularity of the seasons appears remarkable to a stranger. N. and n.w. of this, the winters are severe. The desert region of the centre and east, and the country on its border, endure most oppressive heat during summer, and piercing cold in winter. The Caspian provinces, from their general depression below the sea-level, are exposed to a heat in summer almost equal to that of the W. Indies, and their winters are mild. Rains, however, are frequent and heavy, and many tracts of low country are marshy and extremely unhealthful. Except in the Caspian provinces, the atmosphere of P. is remarkable above that of all other countries for dryness and purity.

The cultivated portions of P., when supplied with moisture, are very fertile, producing immense variety of crops. The chief cultivated products are wheat (best in the world), barley, and other cereals, cotton (of which, according to the statement of the Persian ambassador at London 1861, enough could be grown in the s. provinces to supply the manufactories of w. Europe), sugar, rice, and tobacco. The vine flourishes in several provinces, and the wines of Shiraz are celebrated in Eastern poetry. Mulberries are largely cultivated, and silk is one of the most important products of the kingdom.

The forests of the Elburz abound with wild animals—wolves, tigers, jackals, boars, buffaloes, foxes, and the Caspian cat. Lions and leopards also abound in Mazanderan. Among domestic animals, the horse and camel hold the first place. The horses have always been celebrated as the finest in the East: they are larger and more handsome, but less fleet, than the Arabian horses. The Caspian rivers abound with fish, especially sturgeon, great quantities of which are cured and exported to Russia. The mineral products of P. are insignificant, with the sole exception of salt. Iron is abundant in Azerbijan, but is little worked; copper occurs in considerable quantity in the mountains of Mazanderan and Kerman; and lead, antimony, sulphur, and naphtha also abound. Dr. Fulze, of the Imperial Austrian Mining School, who had been sent to P. by Baron Reuter to explore the mineral wealth of the country, reported, 1874, Jan., the discovery of an important coal-field.

Inhabitants.—The settled population are chiefly Tajiks, descendants of the anc. Persian race, with intermixture of foreign blood. To this class belong the agriculturists, merchants, artisans, etc. The Tajiks are Mohammedans of the Shiite sect, except the remaining Parsees or Guebres (q.v.), numbering (1868) 793, who are found in

Kerman and Fars, and still retain their purity of race and religious faith. The Tajiks have been spoken of as timid, cunning, and servile, but in the cities of Turkestan recently conquered by Russia they make excellent subjects, ready and apt to adopt and appreciate the knowledge and habits of Europe. In the work quoted below, Vambery speaks of their industry, and their capacity for and love of culture. He says that that which the Japanese are in the e. the Tajiks may become in the w. of Asia; and it is settled that they will form the medium for introduction of the civilization of the West into the interior of Asia. The nomad or pastoral tribes, or eylats (*eyl*, a clan), often spelt *illyats*, are of four distinct races—Turkomans, Kurds, Lûurs, and Arabs. Their organization is very similar to that which formerly subsisted among the Highland clans of Scotland, except that they are nomad, while the Scottish clans inhabited a fixed locality. Each tribe is ruled by its hereditary chief (*ujak*), and under him by the heads of the cadet branches (*tirehs*) of his family. Of the four nomad races, the Turkoman is most numerous, and is at the present day the ruling race in Persia. The Kurds are few, the greater part of their country and race being in the Turkish dominions. The Arabs also are few, and at the present day can scarcely be distinguished from the Persians, having adopted both their manners and their language. The Lûurs are of nearly pure Persian blood. The nomad races, especially the Turkomans, profess the Sunni creed; they are distinguished from the Tajiks by their courage, manliness, and independence of character; but they are inveterate robbers, and since their entrance into the country, in the 10th c., it has been continually distracted by civil wars and revolutions. There is a small population of native Christians—the Nestorians of Urmah and Telmais. Including those who have joined the Rom. Cath. and Prot. churches, their whole number does not exceed 25,000. They are agriculturists, and suffer great wrong and oppression from the chiefs who own the villages in which they live. The Jews number 15,000. [For total pop., see at end.]

The insecurity of property has prevented the improvement of land, the extension of trade, and public works of every kind. The roads are utterly neglected. The houses, those of the wealthiest people not excepted, appear contemptible, being generally of earth or mud, and are grouped, even in the towns, with little attention to uniformity or order. They scarcely ever exceed one story in height, and are surrounded by high blank walls. The public buildings, such as mosques, colleges, and caravansaries, are of similar appearance to the ordinary houses, and of the same materials. The interiors, however, of the abodes of the rich are sometimes paradises of luxury and elegance; and however offensive to a European eye may be dwellings constructed of mud, it is questionable whether, with all its disadvantages, mud is not a better building material than wood or stone in

a country with such a climate as Persia. The miserable look of the towns is, however, greatly improved by the beauty of the gardens which surround the houses.

Manufactures and Trade.—The trade of P. is of little importance. Silk is the great staple, and is produced in every province, but chiefly in those of the north. The failure of the crop has frequently interfered seriously with this branch of industry. Cotton and woolen fabrics, shawls, carpets, and felts are largely manufactured for use and export in Khorassan. Trade is carried on by caravans with the interior of Asia and the chief towns of Persia. These caravans exchange the products of P. for muslin, leather, skins, nankeen, china, glass, hardware, gums, dye-stuffs, and spices. The greater part of the commerce of P. centres at Tabreez, to which are conveyed all the products of eastern P., Turkestan, Cabul, Beloochistan, and India. European goods are brought to Tabreez by Constantinople and Trebizond. While in recent times the great overland routes have been rendered insecure by the unsettled state of Turkestan and Afghanistan, the communication between P. and foreign countries has been increased by the Caspian and the Persian Gulf. On the former sea, 1873, there was a Russian fleet of schooners and screw steamers. Two or three of these vessels sailed weekly from Astrakhan with merchandise for the Persian coast. There were three passenger steamers, one of which ran weekly to the s. shores of the Caspian, touching at Entzdi, Mashadisar, and Ashurada. In the Persian Gulf the British India Steam Navigation Company had recently a regular line of fine steamers running fortnightly from Bombay to Bassorah, and touching at Bender-Abbas and Bushire. The exports to India consist chiefly of horses, dried fruit, and drugs; and the imports from that country and Europe, of broadcloths, cotton-goods, jewelry, arms, cutlery, watches, earthern, glass, and metal wares, etc. The whole foreign trade of P. has been estimated roughly at —imports $12,500,000; exports $7,500,000. British produce exported to P. (1875) was valued at $222,213; (1901) $5,701,665. Exports from P. to Britain in those years were valued at $215,448 and $709,770. It is doubtful how far the existing commerce of P. will make the construction of railways profitable. Baron Reuter, under a concession made to him by the shah, obtained power to construct railways from the Caspian to Teheran and from Teheran to the Persian Gulf; but there is now only a small railway open (6 miles).

Government, Taxation, Education, etc.—The government of P. is a pure despotism, limited only by domestic intrigues, dread of private vengeance, and an occasional insurrection. Insurrection is the principal check against unjust government on the part of the monarch, while the former two operate as powerful restraints on his ministers. The monarch, who has the titles of 'Shah' and 'Padishah,' possesses authority over lives and property of his subjects. His deputies, the

governors of provinces and districts, possess similar authority over those under them; their actions, however, are liable to revision by the shah, who may summarily inflict any punishment on them for real or alleged misgovernment. Oppression of the working and mercantile classes is almost a necessity of such a form of government. The central government consisted till lately of the *Sadri-Azem* or Grand Vizier, with various dependent officials. Now there is a ministry, nominally modelled after the cabinets of European states, of which the head is called pres. of the council. He is supported by the ministers of foreign affairs and of war, of justice, of public worship and of mines, of commerce, telegraphs, agriculture, industry, and public works, the commander-in-chief, and the master of the ceremonies. The law, which in civil cases is administered by Mollahs (q.v.), in criminal cases by a state court, is founded on the Koran and on tradition. The usual punishments are fines, flogging (the bastinado), and death, by either decapitation, stabbing, or torture. The Beglerbegs or governors of provinces, always chosen from the governing race, the Turkomans, and generally of the blood-royal, oppress to the utmost the poor Tajiks. They are seldom able, however, to protect their provinces from the ravages of the predatory eylat hordes, who, though nominally subject to the shah, are governed by their own khans, and are really independent. The revenue is derived—(1) From a tax on the gross produce of land, 20 per cent. is supposed to be the amount payable to the crown by the landholders; as a general rule, however, this amount is somewhat exceeded, and 25 per cent. may be taken as the average assessment; (2) Duties on cattle and flocks—in case of goats, sheep, and cows, 8 per cent. on value of wool and butter yielded; (3) Customs dues; (4) Capitation tax of 16 cents on each male over 18 years of age; (5) Rates levied on incomes of artisans and dealers of 20 per cent., and duties on provisions brought to market. In theory, these are the taxes authorized by the government; but R. Thomson states that in practice a frightful system of bribery and extortion prevails. The wealthy and powerful escape the rapacity of the provincial governors, but as much as possible is taken from the hard-working peasants. He believes that the irregular exactions amount to a sum equal to the legal assessments, and that not a penny of the money so extorted is applied to public purposes. The annual revenues and expenditures generally balance at about $7,100,000, the greater portion of the revenues being derived from direct taxes and about $1,500,000 from customs. The debt is over $16,737,500. The new government is described under *History*.

Elementary education is very generally diffused among all classes. There are a large number of colleges where students are instructed in religion and Persian and Arabian literature. Among the upper classes it is asserted

that the Mohammedan religion is rapidly loosing its hold, and that unbelief is widely prevalent.

Political Divisions, etc.—From earliest times till the 19th c., P. was divided into seven or eight great divisions; but about the time when it was attempted to introduce European civilization into the country, and discipline into the army, the country was anew divided into 25 provinces—viz., the three Caspian provinces of Ghilan, Mazanderan, and Astrabad, in the n.; Azerbijan, Ardelan or Persian Kurdistan, Luristan, and Khuzistan, in the w.; Fars, Laristan, and Kerman with Mogistan, in the s.; while the great province of Irak-Ajemi in the centre was divided into Khamsah, Kasbin, Teheran, Hamadan, Kûm, and Ispahan; and that of Khorassan in the e. into Yezd, Tabas, Ghayn and Birjun, Turshiz, Meshid, Damghan, Semnum, and the Dasht Beyad, or the Great Salt Desert. There are many interesting ruins of ancient, populous, and celebrated cities in Persia—e.g., Persepolis (q.v.), Rhages or Rhé, Shahpur, Istakhar, Tûs, Merv, Shushan, Hamadan, etc.; and the monuments and inscriptions found at some of these places form a highly-interesting study. See BEHISTUN.

Army.—The standing army, according to the recent army laws, consists of 105,500 men, but the majority of these exist only on paper. The regular army is really composed of about 35,400 infantry and 2,600 artillery, while there are about 3,300 irregular cavalry, a few thousand irregular infantry, and the guards. The officers in the Persian army are said to be ignorant and inefficient, but the soldiers are described as obedient, sober, intelligent, and capable of enduring great fatigue. The irregular cavalry, which forms the bravest portion of the Persian army, is equal to the Cossacks in the Russian army, and much superior to the Turkish sultan's Bashi-Bazouks.

History.—According to the *Shah Nameh* of Firdusi (q.v.), the history of P. begins thousands of years before the Christian era. Little has been done toward extracting the grains of historical truth that may be contained in the mass of fable that constitutes the native Persian annals; though hopes are cherished that by aid of the many inscriptions and monuments daily discovered, light may yet be thrown on many points. In the mean time, we must rest contented with the accounts derived from Greek writers. The n.w. part of Iran, anc. Media (q.v.), was, at the earliest period known to the Greeks, a part of the Assyrian empire, but the Medes revolted, and B.C. 708, under Dejoces, established an empire which subdued both that of Assyria and their own kindred tribes of Persis: see MEDIA.—About B.C. 537 the Persians under CYRUS (q.v.)—the Kai-Khusru of the Persians—(reigned B.C. 559–529) rebelled, subdued their former masters, the Medes (who from this time became amalgamated with them), and established a mighty empire, which included, besides P., as far as the Oxus and Indus, Asia Minor, Syria, Palestine, and Mesopotamia.—

His son, CAMBYSES, a most ferocious and blood-thirst. tyrant (reigned B.C. 529–522), subdued Tyre, Cyprus, and Egypt.—After the brief rule of the usurper SMERDIS (B.C. 522–521), DARIUS I. (q.v.), surnamed HYSTASPES—the Gushtasp of the Persians—(B.C. 521–485), mounted the throne. He was a politic and energetic prince, firmly established his dynasty, and added Thrace and Macedonia to his empire; but his two attempts to subdue Greece were completely foiled, the first by the Thracians, and the second by the Athenians at Marathon (B.C. 490).—His son, XERXES I. (B.C. 485–465)—the Isfundear of the Persians—renewed the attempt to subdue the Greek states, and though at first successful, was by the defeats of Salamis and Platæa compelled to limit himself to a defensive warfare which exhausted the resources of his kingdom.—His son, ARTAXERXES I. (B.C. 465–425), surnamed LONGIMANUS (the Bahman of the Persians, better known as Ardeshir Dirazdust), was a valiant prince, but unable to stay the decadence of P., which had commenced. He, however, crushed a formidable rebellion in Egypt, though his wars with the Greeks and Ionians were unsuccessful. The empire then became a prey to intestine dissensions, which continued during the reigns of his successors, Xerxes II., Sogdianus, Darius II., Artaxerxes II., and Artaxerxes III.—DARIUS III. CODOMANNUS (B.C. 336–329) (the Darab II. of the Persians), the last of the dynasty, was compelled to yield his throne to Alexander (q.v.) the Great, King of Macedon (known as Secunder by the Persians), who reconquered all the former provinces of P., and founded a vast empire, which, at his death B.C. 324, was divided into four parts, P. with Syria falling to the share of the Seleucidæ (q.v.), and its old dependency, Egypt, to the Ptolemies (q.v.). The Seleucidæ soon lost Bactria (now Balkh), which became independent under a series of Greek sovereigns; and about B.C. 246 Parthia (q.v.)—now northern Khorassan—also rebelled under ARSACES I. (the Ashk of the Persian writers), who founded the dynasty of the Arsacidæ, under whom the greater part of P. was wrested from the Greeks, and maintained against both the Greeks and the Romans. The Greek empire of Bactria, said to have included great part of Hindustan, was overthrown by an influx of nomad tribes from Turkestan, and these invaders having been driven out by the Parthians, Bactria was added to their empire.—But the dynasty of the Arsacidæ was brought to an end by a Persian, Ardeshir Babegan, who managed to gain possession of Fars, Kerman, and nearly the whole of Irak, before Arduan, the Parthian king, took the field against him. At last, a great battle was fought (A.D. 218) on the plain of Hormuz, in which the Persians were completely victorious. Babegan was now hailed as Ardeshir, King of P., and 'Shahan Shah,' or king of kings. For the history of this dynasty, see SASSANIDÆ. The Sassanian kings raised P. to a height of power and prosperity such as it never before attained, and more than once

perilled the existence of the Eastern Empire. The last king was driven from the throne by the Arabs (636), who then began to extend their dominion in all directions; and from this period may be dated the gradual change of character in the native Persian race, for they have been from this time constantly subject to the domination of alien races. During the reigns of Omar (first of the Arab rulers of P.), Othman, Ali, and the Ommiades (634–750), P. was regarded as an outlying province of the empire, and was ruled by deputy-governors; but after the accession of the Abbaside dynasty (750), Bagdad became the cap., and Khorassan the favorite province of the early and more energetic rulers of this race, and P. consequently came to be considered as the centre and nucleus of the caliphate. But the rule of the caliphs soon became merely nominal, and ambitious governors, or other aspiring men, established independent principalities in various parts of the country. Many of these were transitory; others lasted for centuries, and created extensive and powerful empires. The chief were the TAHERITES (820–872), a Turkish dynasty in Khorassan; the SOFFARIDES (Persian, 869–903), in Seistan, Fars, Irak, and Mazanderan; the SAMANI, in Transoxiana, Khorassan, and Seistan; the DILEMI (Persian, 933–1056), in w. Persia; and the GHIZNEVIDES (q.v.), in e. Persia. These dynasties supplanted each other, and were finally rooted out by the Seljuks (q.v.), whose dominion extended from the Hellespont to Afghanistan. A branch of this dynasty, which ruled in Khaurezm (now Khiva, q.v.), gradually acquired the greater part of P., driving out the Ghiznevides and their successors, the GHÛRI (q.v.); but they, with the numerous petty dynasties which had established themselves in the s.w. provinces, all were swept away by the Mongols (q.v.) under GENGHIS KHAN (q.v.) and his grandson, Hulaku Khan, the latter of whom founded a new dynasty, the PERSO-MONGOL (1253–1335).—This race, becoming effeminate, was supplanted by the EYLKHANIANS 1335, but an irruption of the Tartars of Turkestan under TIMÛR (q.v.) again freed P. from the petty dynasties which misruled it.—After the death of Timûr's son and successor, Shah Rokh, the Turkomans took possession of the w. part of the country, which, however, they rather preyed upon than governed; while the e. portion was divided and sub-divided among Timûr's descendants, till, at the close of the 15th c., they were swept away by the Uzbeks (q.v.), who joined the whole of eastern P. to their newly founded khanate of Khiva.—A new dynasty then arose (1500) in western P., the first prince of which (Ismail, descendant of a long line of devotees and saints, objects of high reverence throughout western P.), having become the leader of a number of Turkish tribes attached by strong ties of gratitude to his family, overthrew the power of the Turkomans, and seized Azerbijan, the seat of their power. Ismail rapidly subdued the w. provinces, and 1511 took Khorassan and Balkh from the Uzbeks: but

1514 he had to encounter a much more formidable enemy—the mighty Selim (q.v.), Sultan of Turkey, whose zeal for conquest was further inflamed by religious animosity against the Shiites, or 'Sectaries,' as the followers of Ismail were termed. The Persians were totally defeated in a battle on the frontiers; but Selim reaped no benefit from his victory, and, after his retreat, Ismail attacked and subdued Georgia. The Persians dwell with rapture on the character of this monarch, whom they deem not only the restorer of P. to a prosperous condition, and the founder of a great dynasty, but the establisher of the faith in which they glory as the national religion.—His son Tamasp (1523–76), a prudent and spirited ruler, repeatedly drove out the predatory Uzbeks from Khorassan, sustained without loss a war with the Turks, and assisted Homayun, son of Baber, to regain the throne of Delhi.—After a period of internal revolution, during which the Turks and Uzbeks attacked the empire without hindrance, Shah Abbas I. the Great (1585–1628) ascended the throne, restored internal tranquillity, and repelled the invasions of the Uzbeks and Turks. In 1605 he inflicted on the Turks such a terrible defeat as kept them quiet during the rest of his reign, and enabled him to recover the whole of Kurdistan, Mosul, and Diarbekir, which had long been separated from P.; and in the e., Candahar was taken from the Great Mogul. Abbas's government was strict, but just and equitable; roads, bridges, caravansaries, and other conveniences for trade, were constructed at immense expense, and the improvement and ornamentation of the towns were not neglected. Ispahan more than doubled its pop. during his reign. His tolerance was remarkable, considering both the opinions of his ancestors and subjects; for he encouraged the Armenian Christians to settle in the country, well knowing that their peaceable and industrious habits would advance the prosperity of his kingdom.—His successors, Shah Sufi (1628–41), Shah Abbas II. (1641–66), and Shah Soliman (1666–94), were undistinguished by any remarkable talents; but the former two were sensible and judicious rulers, and advanced the prosperity of their subjects.—During the reign of Sultan Hussein (1694–1722), a weak and bigoted fool, priests and slaves were elevated to the most important and responsible offices of the empire, and all who rejected the tenets of the Shiites were persecuted. The consequence was a general discontent, of which the Afghans (q.v.) took advantage by declaring their independence, and seizing Candahar (1709). Their able leader, Meer Vais, died 1715; but his successors were worthy of him, and one of them, Mahmud, invaded P. (1722), defeated Hussein's armies, and besieged the king in Ispahan, till the inhabitants were reduced to the extremity of distress. Hussein then abdicated the throne in favor of his conqueror, who, on his accession, immediately devoted his energies to alleviate the distresses and gain the confidence of his new subjects. in both of which

objects he thoroughly succeeded. Becoming insane, he was deposed 1725 by his brother Ashraf (1725–29); but the atrocious tyranny of the latter was speedily ended by the celebrated Nadir Shah (q.v.), who first raised Tamasp (1729–32) and his son, Abbas II. (1732–36), of the Suffavean race, to the throne, and then, on some frivolous pretext, deposed him, and seized the sceptre (1736–47).—But on his death, anarchy returned; the country was horribly devastated by rival claimants for the throne; Afghanistan (q.v.) and Beloochistan (q.v.) finally separated from P., and the country was split into a number of small independent states till 1755, when a Kurd, Kerim Khan (1755–79), abolished this state of affairs, re-established peace and unity in western P., and by his wisdom, justice, and warlike talents, acquired the esteem of his subjects, and the respect of neighboring states.—After the usual contests for the succession, accompanied with the usual barbarities and devastations, Kerim was succeeded 1784 by Ali-Murad, Jaafar, and Luft-Ali, during whose reigns Mazanderan became independent under Aga-Mohammed, a Turkoman eunuch of the Kajar race, who repeatedly defeated the royal armies, and ended by depriving Luft-Ali of his crown (1795). The great eunuch-king (as he is frequently called), who founded the present dynasty, on his accession announced his intention of restoring the kingdom as it had been established by Kerim Khan, and accordingly invaded Khorassan and Georgia, subduing the former country almost without effort. The Georgians besought the aid of Russia; but the Persian monarch, with terrible promptitude, poured his army like a torrent into the country, and devastated it with fire and sword; his conquest was, however, hardly completed, when he was assassinated, 1797, May 14.—His nephew, Futteh-Ali (1797–1834), after numerous conflicts, fully established his authority, and completely subdued the rebellious tribes in Khorassan; but the great commotions in w. Europe produced for him bitter fruits. He was dragged into a war with Russia soon after his accession, and by a treaty 1797 surrendered to that power Derbend and several districts on the Kur. In 1802 Georgia was declared a Russian province. War with Russia was recommenced by P., at the instigation of France; and, after two years of conflicts disastrous to the Persians, the treaty of Gulistan (1813, Oct. 12) gave to Russia all the Persian possessions n. of Armenia, and the right of navigation in the Caspian Sea. In 1826 a third war, equally unfortunate for P., was commenced with Russia, and cost P. the remainder of its possessions in Armenia, with Erivan, and a sum of 18,000,000 rubles for expenses of the war. The severity exercised in procuring this sum by taxation so exasperated the people, that they rose in insurrection (1829, Oct. 12), and murdered the Russian ambassador, his wife, and almost all who belonged to or were connected with the Russian legation. The most humiliating concessions to Russia, and the punishment by mutilation of 1,500 of the rioters,

were required to avert war. The death of the crown-prince, Abbas-Mirza (q.v.), in 1833, seemed to give the final blow to the declining fortunes of P., for he was the only man who seriously attempted to raise his country from the abasement into which it had fallen.—By the assistance of Russia and Britain, Mohammed Shah (1834–48), son of Abbas-Mirza, obtained the crown. He conceived ambitious ideas of annexation. In the days of Nadir Shah, and indeed at many other periods, the Persian frontier had extended over a great part of the Afghan, Belooch, and Khivan boundary. Mohammed resolved to demand reacknowledgment of sovereignty from his alleged vassals in these countries, but his attempt to reannex Herat, 'the key to India,' was resisted by England. The war was terminated 1838, by the landing of a small sepoy force on the shores of the Persian Gulf.—Nazir-uddin succeeded to the throne on his father's death 1848; and the new govt. announced energetic reforms, but failed as completely as those which had preceded it in carrying them out. Following his father's example, the new shah resolved to reassert his claims in Afghanistan and Beloochistan. The ruler of Herat having recognized the claims of Persia, the English govt. remonstrated with the shah, and he was compelled to sign an engagement 1853, Jan. 25, by which he became bound not to interfere farther with the internal affairs of Herat. 1856, Oct., however, on the pretext that Dost Mohammed, the Ameer of Cabul, was about to invade Herat, the Persians again took the city. Having thus violated the terms of the treaty with Britain, war was declared against them, and a British army was landed on the coast of the gulf, which, under Generals Outram and Havelock, repeatedly defeated the Persians, and compelled them to restore Herat 1857, July. Since this time the Persians have not interfered with 'the key to India,' to which so much importance has been attached by England; but they have been engaged in a long series of disputes with regard to their frontier n. and s. of it. After the war of 1857, their encroachments became systematic. In 1868 they occupied Seistan, a province claimed by the Afghans, and extended their jurisdiction over the western third of the country, appearing on the maps as Beloochistan. To put an end to the incessant strife to which these pretensions gave rise, the Persians at length agreed with the ameer of Afghanistan and the Khan of Kelat to refer the questions in dispute to an English commissioner. General Sir Frederick Goldsmid accordingly visited the e. frontier of P., and in 1872 delivered his award. It entirely alters the form long familiar as that of s.e. P. It carries the Belooch frontier back from 58° to 63° e. long., so as to include in P. the inland town of Jalk, and Guadar on the Indian Ocean. All the w. shores of the Lake of Zirreh, and a large triangular tract e. of it, watered by the Helmund, also are annexed to Persia. By the treaty of Berlin 1878, the town and territory of Khotour, on the Turco-Persian

frontier, was ceded to Persia by Turkey. The n.e. frontier was settled by a treaty between Russia and Persia 1881. The Atrek is the frontier as far as Shat; then the boundary runs n.e. to the ridge of the Kopet Dagh, which it follows s.e. to a point a little s. of Askabad: thence to Sarakhs, which is Persian. From Sarakhs the e. frontier runs s. along the river Hari Rud, and so s. to Lake Seistan. The great extension of Russian territory and Russian power on the n.e., while overshadowing Persia to some extent, has had the beneficial effect of sheltering the adjoining regions of Persia from the terrible inroads of the Tekke and other Turkomans, now under Russian authority.—Englishmen did much to explore n.e. Persia in connection with the establishment 1872 of the Anglo-Indian telegraph line from London to Teheran through Russia, and by the e. shore of the Black Sea, in conjunction with the Persian land-telegraph system and the Bushehr-Karachi line.

It was during the reign of Fath 'Ali Shah that official relations began with England and British India. Mahdi 'Ali Káhn was entrusted by the governor of Bombay with a letter to the Shah. He was soon followed by an English envoy from the governor-general, Captain Malcolm of the Madras army. The results were a political and commercial treaty and a return mission to India from Fath 'Ali Shah. In 1887, Sir Henry Drummond Wolff was appointed as the British minister to Persia, Násru 'd-Dín seemed to lend a willing ear to his advocacy of the development of commerce, the construction of roads, and the abolition of various restrictions upon Persian merchants. In May, 1888, the Shah issued a proclamation assuring safety of life and property to all his subjects, and soon afterward declared the Karen River open to international navigation up to Ahváz. In the same year the first railway in Persia was opened. It was a short line of five and a half miles from Teheran to Shah-abdul-Azim, built under the auspices of a Belgian company by virtue of a concession granted two years before. In 1873 Baron Julius de Reuter had become the owner of a concession for the organization of a Persian state bank, with exclusive rights for the issuing of bank-notes and also for the working of Persian mines. Russia then demanded what she considered a corresponding advantage but it was not until 1898, February, that Prince Dolgorouki, the Russian minister, obtained from the Shah a document which gave to Russia the refusal of any railway concession in the country for five years.

The Persian state bank was established by the British royal charter dated 1889, September, and began business the next month as the Imperial Bank of Persia. In November the agreement with Russia concerning railroads was so changed as to interdict all railways whatsoever in Persia. In 1896, May, Násru 'd-Dín Shah was assassinated while paying his devotions at the holy

shrine of Shah-abdul-Azim, a few miles from Teheran. He would have entered the fiftieth year of his reign in a few months. The assassin was a small tradesman of Kermán named Mirza Reza. He had lived for a short time in Constantinople and there imbibed anarchistic principles. He was hanged 1896, Aug. 12. There was but little serious commotion resulting from the assassination, dangerous rioting occurring only in Shíráz and Fárs where some of the citizens were killed and several caravans robbed. Some European firms who lost goods during these troubles were afterward indemnified by the Persian Government. The new Shah, Muzaffar 'd-Dín, was born 1853, March 25, and died at Teheran, 1907, Jan. 9. He was at the time of his father's death governor-general of Azerbáïjan residing at Tabríz where he received the notification of his accession on the day of his father's death. A few days later he proceeded to Teheran where he arrived June 8. He was accompanied to the capital by the British and Russian consuls. In the autumn of 1896, the grand vizier encountered so much opposition from the various members of the Shah's entourage that he found it impossible to carry on his work, and resigned. The Shah immediately formed a new cabinet composed mostly of the enemies of the retiring grand vizier, but in three months the affairs of state were in confusion. The public treasury was empty and the most important department, that of the Interior, was completely disorganized. In June Amin-ed-dowleh was made prime minister and in August raised to the dignity of grand vizier. Several reforms were now attempted with a view to the reduction of expenditures and the increase of the revenue, but these efforts seemed to result only in the unpopularity of the officer who instituted them.

During the financial embarrassment of 1892, Persia had contracted a six per cent. loan of $2,500,000 from London capitalists through the Imperial Bank of Persia. In 1897 various attempts were made to effect another foreign loan with the sole result of discrediting the Persian government in Europe. In 1900 the Russian government permitted the issue of a loan of $12,000,000 at five per cent. This loan is guaranteed by all the customs receipts of Persia excepting those of Fárs and the Persian Gulf ports. The money was immediately remitted to Teheran and nearly all arrears were paid up, including the balance of the London six per cent. loan. Russia now controls Persian finance, thus giving another severe blow to the influence of other powers. Since 1895 British influence there has been on the wane, and Russian domination is constantly advancing. She now controls the commerce of the northern portion of the country. The British consular report of 1902–3, received at the foreign office 1903, June 15, says: 'The year ending 1903, March, was, on the whole, a prosperous one as far as the trade of Kermánsháh is

concerned, notwithstanding the fall in the value of the kran which greatly reduced the profits of the importing merchants. The English pound, which on 1902, March 30, stood at 55¾ krans, rose as high as 60 krans in November of the same year, but gradually fell to 57½ krans, at which rate it remained stationary for some time. Two years of continuous drought have certainly lessened the purchasing capacity of southeastern Persia, but fortunately the agricultural depression has been accompanied by a boom in the carpet trade without which there must have been a famine. In 1904 there was a great scarcity of grain, and all bread was adulterated with barley flour.'

Meanwhile, owing to the confusion in affairs of state, disorganization and mismanagement of executive departments, and jealousies and intrigues among officials, widespread dissatisfaction with and distrust of the government had been created among the people. Agitation for popular representation in governmental affairs was carried on throughout the country with the result that in 1906, August, the Shah was forced to grant a constitution and convoke a representative parliament (called by the Persians a Mejliss) which he opened 1906, Sept. 12. The document which summoned the parliament was as follows:

'The Shah, since his accession to the throne, has always had the intention to introduce real and efficient reforms in all the departments of the state, so as to further the well-being of his people. For this purpose His Majesty has now decided that a national council shall be formed at Teheran, composed of representatives of the Kajar princes (the royal tribe), clergy, nobles, merchants, and tradesmen. These representatives will be elected by their peers. The national council shall deliberate on all important affairs of state, and shall have the power and right to express its views with freedom and full confidence in regard to all reforms which may be necessary to the welfare of the country. The results of the deliberations of the council shall be submitted through the intermediary of the First Minister of State to the Shah for His Majesty's signature, and shall then be carried into effect. The rules of procedure of the national council shall be drawn up with the approval of the members and shall receive the Shah's signature. The council, after determining its rules of procedure, shall then begin to give effect to the sacred laws of Islam and to introduce the necessary reforms.'

Thus it will be seen that no peasants were admitted to membership and that the people could not vote for representatives but that the latter were elected by the groups to which they belonged. The first minister of state proposed the matters to be discussed by the parliament and had the power of veto on all measures adopted, so that the parliament really had no legislative power whatever but was merely a consultative conference.

All legislation in this orthodox Mohammedan kingdom was ordered to conform to the precepts of the Koran. Every principle of government was to be approved by the mullahs, the professional expounders of Mohammedan doctrine and law, who really acted as a supreme court. This body, which numbered some of the keenest men of the middle East among its members, realized for some years that, between the persistent advance of Rus-

sia from the north and the march of England from India, the days of Persian nationality would be numbered unless the national life could be regenerated. The mullahs were frank to admit that under an autocratic régime such regeneration was impossible. They were, therefore, willing to accept complete self-government on a representative basis. As for the Shah himself, he was badly in need of money, and had noted the curtailment of the Russian Czar's power to obtain loans under similar circumstances.

The first national convention was composed of delegates from all parts of Persia, but the majority came from the northern provinces. Its most important problem was the adjustment of the kingdom's finances, and while little was accomplished, as every natural resource by which revenues might be raised had long since been hypothecated in favor of foreign creditors, still the outlook for the future at the end of 1906 was promising.

Internal improvements were also noticeable throughout the kingdom, especially in the northern provinces, where the towns and villages took steps to form local municipal assemblies along European lines and also to inaugurate a fair system of taxation.

The Shah died in January, 1907, and on January 9 was succeeded by his son, Mohammed Ali Mirza, who on 1907, Dec. 23, accepted all the stipulations submitted by his cabinet and parliament and on December 28 took an oath before parliament to support the constitution.

Meanwhile Russia and Great Britain had again entered the arena of Persian politics. In 1834 these two nations had become signatories to an agreement with regard to the succession to the Persian throne and had mutually bound themselves to respect the independence of the country. As occasion arose similar agreements were from time to time entered into. But the financial embarrassment of Persia in 1906 and the approaching death of the Shah necessitated a more precise and complete agreement. Consequently on Aug. 31, 1907, the two countries signed a treaty to maintain the integrity and independence of Persia and the principle of the 'open door.' Great Britain's zone of influence composed the provinces of Seistan and Mekrah (both of strategic value, guaranteeing the defense of India and access to the Gulf of Oman), while Russia's zone, with Ispahan, Yezd and Kasr-i-Chirine, left to her future action the finest provinces of the kingdom. The treaty also provided for the establishment of financial control.

The duration of parliamentary government, however, was not long. In 1907, Aug. 31, the premier, Mirza Ali Asghan, was murdered; serious differences of opinion arose as to how far the power of parliament extended, that body charging the minister of state with using arbitrary power; successive changes of ministry followed rapidly; and finally a list of alleged breaches of the constitution was drawn up and presented to the

Shah with the request that he correct them in order to restore public confidence. The Shah, however, declared himself a friend of the constitution and charged that the leaders of parliament were conspiring against the throne. Fearing personal injury, he surrounded himself with a strong body-guard of Cossacks, but in spite of this protection an attempt was made to assassinate him 1908 Feb. 28, though it was unsuccessful.

In the meantime a disastrous famine had spread over a large portion of the country, there was insubordination in the army, the treasury was empty, corruption was rife in the civil service and revolt had broken out in two cities, Teheran and Ispahan. Furthermore marauding bands and even regular armed forces from Turkey had invaded Persian territory several times during the latter part of 1907 and early in 1908, ostensibly for the purpose of settling boundary disputes. The Kurds continued to raid villages and towns in Persian territory until the fall of 1908 when Turkish troops were dispatched to prevent further depredations.

The Shah's disputes with parliament continued during the spring of 1908 and culminated in June when he sent troops to the parliament house at Teheran to arrest certain alleged conspirators. Parliament refused to surrender these and a battle ensued, finally resulting in the destruction of the parliament house by the Cossacks and the loss of nearly 2,000 lives. Fighting against the Shah's troops continued during June 23d and 24th and the city was then placed under martial law. On June 27 the Shah dissolved parliament, and its president, many members of the Anjumans, and several newspaper editors were arrested and thrown into jail, while the leaders of the Opposition with several other newspaper editors took refuge in the British legation.

Fighting between the government and revolutionary troops continued for several months, and the nationalist troops were uniformly successful. In the latter part of September, 1908, the nationalists attacked the imperial troops at Tabríz and decisively defeated them. Therefore in order to restore tranquility and on the advice of his cabinet, the Shah decreed that parliament be opened October 30, but owing to a deadlock between the warring factors this did not take place. Instead on November 18, the Shah summoned the representatives of the various classes to appear before him for conference, but when these representatives requested that the constitution be restored, the Shah dismissed them from his presence. On November 22 the Shah declared that the assembled representatives had informed him that the people did not desire a constitution nor wish him to convoke parliament, and issued a proclamation in which he said:

'We were prepared to redeem our promise and convoke a parliament, but we learn from the assembled representatives of the people that they do not want a constitution. We have, therefore, decided

to defer to their wishes, and the clergy and ecclesiastics, having recognized that the establishment of a parliament would conflict with the laws of the Islam, we determine that in the future under no pretext shall such a parliament be established.

'Nevertheless, in the interests of right, we have given the necessary instructions for the maintenance of justice. We hereby summon the ecclesiastical body to communicate to the whole people this our resolve, to protect the rights of our subjects and frustrate the wicked designs of evildoers in accordance with the religious law.'

A few days later the Shah rescinded this proclamation and on November 29 established a council of state, composed of 40 members of the conservative aristocracy, to take the place of parliament.

Population.—We have no certain information regarding the population of Persia. Doubtless in antiquity, and even during the middle ages, while the irrigation works still fertilized great tracts of country, it supported a great population. A native estimate, referred to by Sir John Malcolm, fixed the modern population at 200 millions. In the 17th century, the French traveller Chardin thought 40 millions not too high a figure. Recent travellers, however, reduced these sums to numbers varying from 15 to 8 millions. Much surprise was accordingly expressed when R. Thomson, who had travelled in every province of Persia, and collected statistical information, made careful calculation from the taxes collected, etc., and reported that the entire population did not exceed 5 millions, and was probably not over 4 millions. His estimate was generally accepted as the most trustworthy of any; though probably a higher number would now be assigned by most statisticians. He divides the total roughly into 1,000,000 inhabitants of cities, 1,700,000 nomads, and 1,700,000 peasants and villagers; and the following are his estimates of the population of the chief cities: Tabriz, 110,000; Teheran, 85,000; Meshid, 70,000; Ispahan, 60,000; Yezd, 40,000; Kerman, 30,000; Kermanshah, 30,000; Hamadan, 30,000. Undoubtedly the population has long been diminishing, a fact attributable to misrule and extortion—neglect of the great irrigation works—and frequent famines in a dry country where cultivation depends on artificial supply of water. A later statement gave the population as 9,500,000.

See Mr. Thomson's official *Report on Persia* (1868); *History of Persia*, by Watson (1873); *History of Persia*, by G. C. R. Markham (1874); *Central Asia and the Anglo-Russian Frontier Question*, by A. Vambery (1874); *Through Persia*, by Arnold (1876); *Persia*, by *Goldsmid* (1880); F. Martin's *Statesman's Year-Book;* S. G. W. Benjamin's *Story of Persia* (1886); *Persia and the Persians* (1886). Sayce, *Ancient Empires;* Rawlinson, *The Five Great Monarchies;* Spiegel, *Iränische Alterthumskunde;* Clinton, *Fasti Romani;* Saint-Martin, *Hist. du Bas-Empire;* Lady Sheil's *Diary in Persia; Erskine's Búbar;* Prof. Creasy's *History of the Ottoman Turks;* Ferrier's *History of the Afghans;* and W. P. Cresson's *Persia: the Awakening East* (Philadelphia, 1908).

PERSIAN, a. *pėr′shăn*, or PERSIC, a. *pėr′sĭk:* from or relating to *Persia:* N. the language of Persia. PERSIAN BERRY, a yellow dye-stuff. PERSIAN WHEEL, a large wheel surrounded with buckets for raising water from a low to a high level. PERSIANS, n. plu. *pėr′shănz*, in *arch.*, sculptured male figures used instead of columns.

PER′SIAN ARCHITECTURE: architectural style interesting both on its own account, and as supplementary to and explanatory of that of Assyria, which, with the similar architecture in Egypt, is the earliest of which we have any knowledge. The buildings of Persia and Assyria closely resemble each other; and, because of the mode and the materials in which they were constructed, their remains illustrate and complete each other's history. In Assyria, where no natural solid building materials exist, the walls are composed of masses of sun-dried brickwork, lined on the inside, to a certain height from the floor, with large sculptured slabs of alabaster. These have been preserved to us by the falling in of the heavy earthen roofs, with which, as the later Persian buildings reveal to us, the Assyrian palaces were covered. The explorations of Layard and Botta, and the specimens brought home by the former and now in the British Museum, have made these sculptures familiar to us. The subjects usually are large bulls with human or lions' heads; priests with human bodies and eagles' or lions' heads, performing religious service before the 'sacred tree.' The Assyrian remains all are of palace-temples, buildings somewhat resembling the Egyptian temples (which were also palaces); and many of the sculptures represent the exploits of the king in war and in peace. The palaces are always raised on lofty artificial mounds, and approached by magnificent flights of steps.

The buildings of Assyria extend over a very long period, the oldest at Nimrud dating B.C. 1300–800, and the more recent at Khorsabad and Koyunjik B.C. 800–600. To these succeeded Babylon in the reign of Nebuchadnezzar, and the Birs Nimrud; but these are mere masses of decomposed brickwork, without any sculptures of harder material.

After Babylon came Pasargadæ—where are still the ruins of the splendid palaces of Cyrus and Cambyses—and Persepolis (q.v.), cap. of Darius and Xerxes (B.C. 560–523); and some remains are still found at Susa, Ecbatana, and Teheran. At Persepolis, we find the very parts preserved which at Nimrud and Khorsabad are lacking; for here is abundance of stone, and the pillars, walls, doorways, etc. (which, in the early examples, were no doubt of wood, and have decayed), being of stone, are still preserved. This has enabled Mr. Fergusson to 'restore' these buildings, and to produce most interesting designs, showing not only how the palaces of Persia were constructed and lighted, but from them suggesting how the arrangements of all the ancient architecture of Egypt and Syria must have been designed.

The halls at Persepolis were square in plan, having an

equal number of pillars in each direction for the support of the roof, which was flat. In the centre, a portion was left open for the admission of light, and sheltered by another roof raised upon pillars. The accompanying section (fig. 1) of the Great Hall of Xerxes (from Fergusson's *Handbook of Architecture*) will explain this arrangement. This hall is the most splendid building whose remains exist in that part of the world. The remains of the 72 columns with which it was adorned are still extant (fig. 2). The hall had 36 columns, six on each side, and on three sides had an external portico, each with two rows of six columns. These columns had capitals, composed of bulls' heads and shoulders (fig. 3),

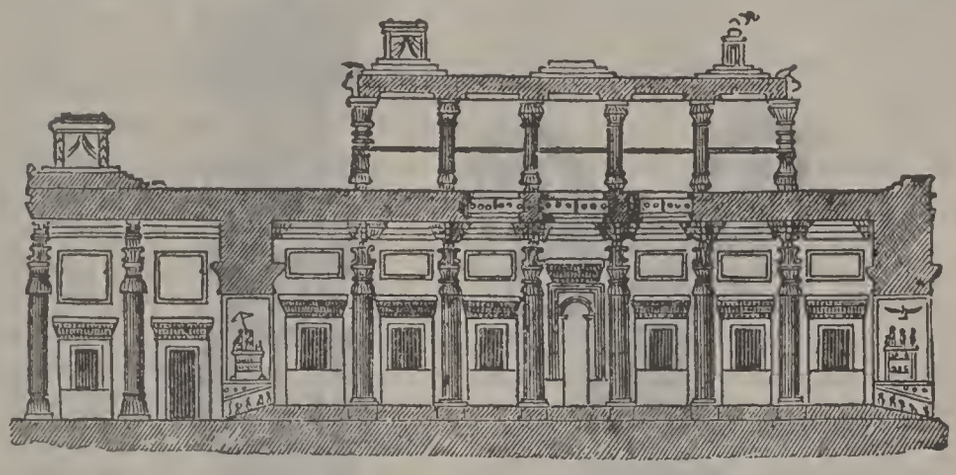


Fig. 1.—Section of Hall of Xerxes at Persepolis.

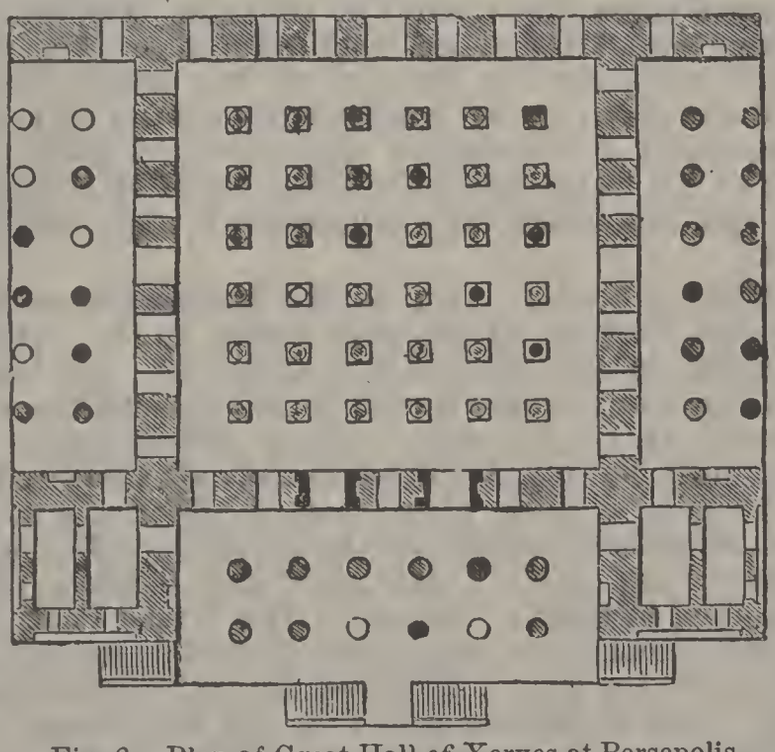


Fig. 2.—Plan of Great Hall of Xerxes at Persepolis.

between which the beams of the roof rested; while others were ornamented with scrolls like the Ionic order (fig. 4). The bases also are suggestive of the origin of that Greek style. This hall was 350 ft. by 300, and covered more ground than any similar buildings of antiquity,

or any mediæval cathedral except that of Milan. The palaces of Persepolis stand on lofty platforms, built with walls of Cyclopean masonry, and approached by magnificent flights of stairs, adorned, like the palaces, with

Fig. 3.

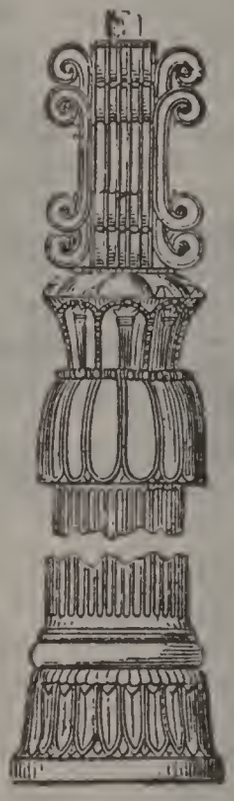


Fig. 4.

Details of Persian Architecture.

sculptures somewhat similar to those of Assyria. The interiors were ornamented with paintings. The use of the arch was known in Assyria, as has been shown by the subterranean arched conduits discovered by Layard, and the gates of Khorsabad discovered by Place. The arches of the latter spring from the backs of sculptured bulls, and are beautifully ornamented with enamelled bricks.

PER'SIAN GULF: arm of the Indian Ocean which penetrates between Arabia and Persia to the extent of 650 English m. in a general n.w. direction. Its breadth varies from 55 m. at the mouth to 250 m., and the area is estimated at 117,300 sq. m., from which about 1,930 sq. m. must be subtracted for the islands scattered over the w. half, or lying close inshore along the e. side. The chief of these islands are Ormuz (q.v.), at the mouth; Kishm, 810 sq. m. in extent; and the Bahrein Islands (q.v.), chief of which is Samak. The Great Pearl Bank stretches along the w. side from Ras Hassan to nearly half-way up the gulf. The coast is mostly of calcareous rocks. On the Arabian side, it is low and sandy, occasionally broken by mountains and cliffs; on the Persian side, it is higher and abrupt, with deep water close inshore, owing to the mountain-ranges of Fars and Laristan running close to the water's edge. The islands are partly of limestone and partly of ironstone, and gen-

erally destitute of springs, barren, desolate, with numerous traces of volcanic eruptions. With the exception of the Shat-el-Arab (q.v.), the P. G. receives only insignificant streams. Its e. side presents abundance of good anchorage, either in the numerous bays or in the lee of islands. The greater portion of its shores now belongs to the imaum of Muscat. The coasts of the gulf have been explored by successive British expeditions, the last of which, 1821–25, made a complete trigonometric survey of the Arabian shore. The order of the periodic currents in this gulf is precisely the reverse of that of the Red Sea (q.v.) currents, as the gulf currents ascend from May to Oct., and descend from Oct. to May. Oriental geographers give to this gulf the name 'Green Sea,' from a remarkable strip of water of green color along the Arabian coast. It is strange that from the time of Nearchus, admiral of Alexander the Great, who was the first to make the P. G. known to Europeans, the Persians have never ruled supreme over its surface.

PER'SIAN LANGUAGE AND LITERATURE: ancient and modern idioms of Persia, in general designated as Iranian or West Aryan, belonging to the great class of the Indo-Germanic languages; and more specifically the language as it is now spoken, with a few exceptions, throughout Persia and in a few other places formerly under Persian dominion, like Bokhara, etc. The more important and better known of the ancient idioms are the following: (1) the *Zend* (the East Iranian or Bactrian language, in two dialects—the 'Gâtha idiom,' and the 'ancient' or 'classical Zend'), which died out B.C. 3d c.—one of the most highly developed idioms, rich in inflections, in the verbs as well as in the nouns, and in the former almost completely agreeing with Vedic Sanskrit; yet such as we find it in the small remains which have survived, it is no longer in full vigor of life, but almost decaying, and grammatically somewhat neglected; it is in fact held by a great authority on the subject (Haug), that the grammar was never fixed in any way by rules. As increasing the difficulty, the texts—the Zoroastrian books—seem never to have been copied with proper care, or by men who had any correct knowledge of the language; so that the critical restoration of the literary remains is extremely difficult, and Zend studies in general may be said to be in their infancy yet. Geographically, this idiom may be placed in northern Persia. Its alphabet is of Semitic origin, and the writing goes from right to left (see ZEND: ZEND-AVESTA). (2) *Ancient Persian*, whose chief remnants are in the cuneiform inscriptions of the time of the Achæmenides, discovered in the ruins of Persepolis, on the rock of Behistun, and some other places of Persia (see CUNEIFORM). Some relics, consisting chiefly of proper names for gods and men, and terms for vessels and garments, have survived in the writings of the classical period, and in the Bible, chiefly in the Book of Dan-

iel. This idiom is much nearer to Zend and Sanskrit than to modern Persian. It has still the structure of an ancient organic Indo-Germanic language, with the distinct peculiarities of an Iranic tongue. (3) *Pahlavi* (q.v.) (West Iranian, Median, and Persian), in use during the period of the Sassanides (after Christ 3d to 7th c.), an idiom largely mixed with Semitic words, and poorer in inflections and terminations than Zend. Its remnants consist of a certain number of books relating to the Zoroastrian religion, of coins and inscriptions; and the language is not quite the same in all cases—according to the larger or smaller infusion of foreign words. The non-Iranian element is known as Huzvaresh, and is simply Chaldee; while the Iranian element differs little from modern Persian. There are three distinct idioms to be distinguished in Pahlavi, and the writing varies accordingly; yet it is not certain whether the difference arises from their belonging to different districts or periods. When, however, Pahlavi ceased to be a living language, and the restoration of the pure Iranian had begun, people, not daring to change the writings, chiefly of a sacred nature, as they had descended to them from the Sassanian times, began to substitute, in reading, the Persian equivalents to the Huzvaresh words. At last a new form of commentaries to the sacred writings sprang up, in which more distinct and clear Zend characters were used, where each sign has but one phonetic value, and where all the foreign Huzvaresh words were replaced by pure Persian ones; and this new form was called (4) *Pâzend*. The transition from the ancient to the modern Persian is formed by the *Parsee*, or, as the Arabs call it, *Farsi*, in use 700–1100, once the language purely of the s.w. provinces, and distinguished chiefly by a peculiarity of style, rigid exclusion of Semitic words, and certain now obsolete forms and words retained in liturgic formulas. It is the Persian anciently written by the Parsees or fire-worshippers, and is in other respects very similar to the present or *modern Persian*, the language of Jâmi, Nizâmi, and Hâfiz—from 1100 to the present time—with its numerous dialects. The purest dialect is said to be that spoken in Shiraz and Ispahan and their neighborhood. In general, this language is deemed by universal consent the richest and most elegant of those spoken in modern Asia. It is the most sonorous and muscular, while it is among the most elegant and most flexible of idioms; and it is not strange that, throughout the Moslem and Hindu realm, it should have become the court language, and that of the educated world in general; holding a position somewhat similar to that which the French language held till a recent period in Europe. Its chief characteristic, however, is the enormous intermixture of Arabic words, which, indeed, make almost half its vocabulary. Respecting its analytical and grammatical structure, it exhibits traces only of that of the ancient dialects of Zend and Achæmenian, of which it is a direct descendant.

The elaborate system of forms and inflections characteristic of those dialects has been utterly abandoned for combinations of auxiliary words, which form independent connective links, and which impart fulness and a surprising ease to speech and composition, but which, at the same time, correspond as little to the classical notion of inflection. The grammar of the Persian language has been called 'regular;' but the fact is, that there is hardly any grammar worth mentioning—at all events, no grammar whose rules could not be mastered in a very short time. To begin with: there is no gender distinguished in declension; the plural is always formed in the same manner, the only distinction consisting in animate beings receiving the affix *ân*, while the inanimate are terminated in *hâ;* further, that instead of the inflection in the different cases, found in the ancient languages, either a *mar* (hitherto unexplained) is prefixed, or a *râ* (*râh* = way, by reason of—Pahlavi, Parsi) is affixed. Between the genitive and the word which governs it, also between a noun and its following adjective, an *i* is inserted. This is the whole declension, not only of the noun, but also of the adjective and pronoun. The comparative is formed, as in the mother-tongues, by the addition of *ter;* the superlative adds *terîn*, which is New-Persian exclusively. Not even the pronouns have a gender of their own; the distinction between masculine and feminine must be expressed by a special word, denoting male or female. There is no article, either definite or indefinite. Singularity of a noun is expressed by an appended *ê*, remnant of *aêva*, one. The flection of the verb is equally simple. There is a set of personal terminations for all tenses—*am*, *i*, *ad* or *ast; êm*, *êd*, *nd;* the infinitive ends in *tan* or *dan*, the past participle in *tah* or *dah*. The aorist is formed by adding to the root the terminations *am*, *i*, *ad; em*, *ed*, *and;* the preterite by dropping the *n* of the infinitive, and substituting the usual terminations. The prefix *mi* or *hamí* (Parsi and Huzvaresh = always) transforms the preterite into the imperfect; while the prefix *bi* or *bih* (the present of the verb 'to will') alters the aorist into the simple future. The other tenses are compounds of the past participle and auxiliary verbs, as in the Teutonic and other modern tongues. The passive is formed by the various tenses of the verb *shudan*, 'to be, to go, to beware,' being placed after the past participle. As to syntax, there is none, or, at all events, none which would not come almost instinctively to any student acquainted with the general laws of speech and composition. The time of its greatest brilliancy may be designated as that in which Firdusi wrote, when Arabic words had not swamped it to the vast degree in which it is now found, and were still, as far as they had crept in, amenable to whatever rules the Persian grammar imposed upon the words of its own language.

In the history of the Persian writing, three epochs are distinguished. First, is the Cuneiform (q.v.), by

the side of which there seems, however, to have been in use a kind of Semitic alphabet for common purposes. This, in the second period, appears to have split into several alphabets, all related to each other, and pointing to a common Syriac origin (such as the different kinds of Pahlavi characters and the Zend alphabet) cleverly adapted to the use of a non-Semitic language. In the third period, the Arabic alphabet is found, enlarged for Persian use by an addition of diacritical points and signs for such sounds as are not in Arabic (*p*, *ch*, *zh*, *g*). The characters are written in a somewhat more slanting manner (Talik) in Persian, and the writing is thus slightly different from the usual Arabic Neskhi.

The much-spoken-of close connection between German and Persian—both of Indo-Germanic kin—is merely a popular fallacy, caused by a misunderstood dictum of Leibnitz: 'Integri versus Persice scribi possunt quos Germanus intelligat,' which was enthusiastically taken up and 'proved' by Adelung, Hammer-Purgstall, and others; and which has even led to the assumption, that the Germans came directly from Persia, or that the Goths once were mixed with the Persians. We mention it as a philological absurdity of by-gone days.

For the Literature of the Persians before the Mohammedan conquest, see ZEND: PAHLAVI: PARSEES: ETC. The literary period now under consideration is distinguishable by the above-mentioned infusion of Arabic words into the Persian language, imported together with the Koran and its teachings. The writers are, in fact, one and all, Mohammedans. With the fanaticism peculiar to conquering religions, particularly to Islam, all the representatives of old Persian literature and science, men and matter, were ruthlessly persecuted by Omar's general, Saad Ibn Abi Wakkas. The consequence was, that, for the first two or three centuries after the conquest, all was silence. The scholars and priests who would not bow to Allah and his Prophet and to the new order of things, and who had found means to emigrate, took with them what had not been destroyed of the written monuments of their ancient culture; while those that remained at home were forced to abandon their wonted studies. Yet, by slow degrees, as is invariably the case under such circumstances, the conquered race transformed the culture of the conquerors to such a degree, that native influence soon became paramount in Persia, even in theology—the supreme science. It is readily granted by later Mohammedan writers, that out of the body of the Persians exclusively sprang the foremost scholars, if not all the greatest scholars and authors, on religious as well as grammatical subjects, historians and poets, philosophers and men of science; and the only concession that they made consisted in their use of the newly imported Arabic tongue. A further step was taken when, after the Islam sway had ceased, the Persians, under upstart

native dynasties, returned also to the ancient language of their fathers during the first centuries of Mohammedanism. The revived national feeling, which must have been stirring for a long time previously among the masses, then suddenly burst forth in prose and in verse, from the lips of a thousand singers and writers. The literary life of Persia, the commencement of which is thus to be placed in the 9th c. after Christ, flourished with unabated healthy vigor for five centuries, and produced a host of writers in every branch of science and belles-lettres, of whom we can here give only a rapid survey, referring for the most important names to the special titles throughout this work. Beginning with poetry, we hear, under the rule of the third of the Samanides, Nasr (about 952), of Abul Hasan Rudegi, the blind, who rose by the king's favor to such eminence that he had 200 slaves to wait upon him. But little has remained of his 1,300,000 distichs, and of his metrical translation of Bidpai's Fables. About A.D. 1000, we hear of Kabus, the Dilemite prince, as author of *The Perfection of Rhetoric*, and poems. In the time of the Gasnevides, chiefly under Mahmud, who surrounded himself with no less than 400 court-poets, we find those stars of Persian song—Ansari (1039), author of *Wamik and Asra*, and 30,000 other distichs and Kassidahs in honor and praise of the king; further, Ferruchi, who, besides his own poems, wrote also the first work on the laws of the Persian metrical art; and, above all, Firdusi (q.v.), greatest epic poet, author of the *Shah Nameh*, or Book of Kings; who lived one of the most brilliant and romantic lives that ever fell to the lot of genius, and ended it forgotten and in misery. With him, but darkened by his brightness, flourished Esedi, his countryman, from Tus. Among the poets under the Atabek dynasty, we find that most brilliant Persian panegyrist, Anhad Addin Enweri, who, with his praise, well knew how to handle satire. The best of the older mystic poets of that period is Senayi, author of 30,000 distichs, who for his poem *Hadikat* was nominated official singer of the Sufis. Nizami (about 1200) is founder of the romantic epos; the greater part of his *Chamshe*, or collection of five romantic poems (*Chosru and Shirin*, *Mejnun and Leila*, etc.), being almost as well known in Europe as it is in the East; and to whom Kisilarslan the king presented for one of these poems no less than fourteen estates. His grave at Gendsheh is still visited by many a pious pilgrim. And here it is to be noted that the branch of Eastern theosophical literature preeminently cultivated in Persia is the mystic (Sufistic) poetry, which, under Anacreontic allegories, in glowing songs of wine and love, represented the mystery of divine love and of the union of the soul with God (see SUFISM). In this province we find chiefly eminent poets like Senáji (about beginning of 13th c.), and Ferid Eddin Atta (b. 1216), renowned author of *Pend Nameh* (Book of Counsel), a work containing the biographies of saints

until his own day. His principal strength, however, lay in his mystic poems; and such is the depth and hidden meaning of his rhymes, that, for centuries after him, the whole Moslem world has busied itself with commentaries and conjectures on the meaning of a great part of his sacred poetry. He died a martyr, about 1330, more than a hundred years old. Greater still, in this peculiar field, is Djalal Eddin Rumi, born at Balkh (d. 1266), founder of a still existing most popular order of dervishes (Mewlewi). His poem on *Contemplative Life* has made him the oracle of oriental mysticism till this day. He wrote also a great number of lyrical poems, which form, as far as they have been collected for this special purpose, a breviary for the faithful Sufi. Anhadi of Meraga (d. 1297) also deserves mention.

The 13th c. cannot better be closed than with Sheikh Muslih Addin Sâdi of Shiraz (d. 1291), first and unrivalled Persian didactic poet. His *Bostan and Gulistan* (Rose- and Fruit-Garden) are not only of Eastern but also of European celebrity, and embody all the mature wisdom, the grace and happiness of composition, of a true poet, ripe in years as in experience. At the beginning of the 14th c., we meet several meritorious imitators of Sâdi in didactic poetry.

But above all these, as above all other Persian lyrical and erotic poets, shines Hâfiz (q.v.), the 'Sugar-lip,' who sang of wine and love, and nightingales and flowers; and who so offended mock-piety, that it even would have tried to refuse him a proper burial, had not the oracle of the Koran interposed. After him, the glory of Persian poetry begins to wane. Among his successors stands highest Djâmi (d. 1492), poet of varied genius, second only in every one of the manifold branches to its chief master—in panegyric to Enveri, in didactic to Sâdi, in romance to Nizami, in mysticism to Jelal-eddin, in lyric to Sâdi; and he, with these and Firdusi, form the brightest representatives of Persian poetry. He is brilliant, however, as a romantic poet. Of prose works, we have by him a history of Sufis, and a valuable collection of epistolary models. Before concluding this branch of literature, we must notice the dramatic poetry of the Persians, which is not without merit, but of small extent, and to be compared principally with the ancient French mysteries.

The numerous tales, stories, novels, anecdotes, anthologies, and all the miscellaneous entertaining literature in which Persia abounds—and of which the best known, perhaps, are the adaptation of Bidpai's Fables; *Anvari Suheili*, by Husein Vais Kashifi; the *Tutinameh*, or Book of Parrots, a collection of fairy-tales, by Nechshebi; the *Behari-Danish*, by Inajeth Allah, etc.—form fit transition from poetry to prose, for little more is to be said of Persian poetry after the 15th c. Modern imitations of ancient classical works, such as the New Book of Kings, the *Shahinshah Nameh*, which treats of modern Persian history, the

George Nameh, which sings the English conquests in India, etc., are hardly worth pointing out in this brief summary. Of native writers on the poets are Dewlet Shah (who describes the poets from the 10th to the 15th c.), Sam Mirsa (the poets of the 16th c.), and Luft Ali Beg (the poets of modern time). In prose, it is chiefly history which deserves our attention. Able rivals of the great Arabic historiographers sprang up at an early period. For the mythical times, or those of which no knowledge, save through a medium of half-legend, has reached later generations, Firdusi's gigantic epos remains the only source. But after the chroniclers we find Fadhl Allah Reshid Eddin, the vizier of Ghazan, b. 1247 at Hamadan, who was put to death 1320. He wrote the *Collector of Histories*, three vols., to which he afterward added a fourth geographical vol.: a summary of the history of all Mohammedan countries and times, containing besides a complete history of sects. Worthy and contemporaneous rivals are Fachr Eddin Mohammed Bina Kiti, author of a universal history; and Khodja Abdallah Wassaf, the panegyrist, a model of grand and rhetorical style. His most successful imitator in the 14th c. is Abdel Ressak; and in the 15th, Sheref Eddin Ali Yezdi, who wrote the history of Timûr. Until that period, pomposity of diction was considered the principal beauty, if not the chief merit, of a classical Persian history. From the 15th c. onward, a healthful reaction set in, and simplicity and the striving after the real representation of facts became the predominant fashion. The *facile princeps* among these modern historians is Mirkhond, whose Universal History (*Ranset Essafa*) comprises the period from creation to the reign of Sultan Hasan Beikara, in seven books. After him are to be mentioned his son Khondemir, Gaffari, Moslih Eddin Mohammed Lari, and Abu Tahir of Tortosa in Spain, who wrote the *Derab Nameh*, a biographical work on the Persian and Macedonian kings, and the ancient Greek physicians and philosophers.

Among Indian historians—and they form a most important class—who wrote in Persian, were Mohammed Kasim Ferishtah (1640), who wrote the ancient history of India, to the European conquest; Mohammed Hashim. Abul Fadel Mobarrek (*Akbar Nameh*); further, Abdel Ressak (*History of the Padishahs*), Mirza Mehdi, Gholam Hussein Khan, and others. One of the most recent works of this description is the *Measiri Sultaniye*, which contains the history of the present dynasty of Persia (pub. Teheran 1825, transl. by Bridges, Lond. 1833).

Biographies, legends, histories of martyrs, and the like are legion. Most of the biographies of the Prophet, however, are taken from the Arabic.

Little is to be said of Persian productions on special branches of exact science. There are a few works on geography—generally treated together with history—

such as those of Mestafi, Ahmîn Ahmed Rasi, Berdshendi, etc. In theology, little beyond translations of the Koran, and a few commentaries on single chapters, and of some portions of the Traditions (*Sunnah*), has been produced—the Arabic works being sufficient in religious matters for all Mohammedans. For the history of early Persian religion, important works are the *Ulemai Islam* and the *Dabistan*, a description of all the creeds of the East. Jurisprudence shows little that is original, and not mere translation, partial commentary, or adaptation in Persian: the *Hedadshah*, the *Inadshah*, the *Futawa Alemgiri*, are the most important legal works. Much has been done in medicine, surgery, pharmacy, physical sciences, by Persian writers; but nearly all their chief works being written in Arabic, they do not concern us here. Mathematics, astronomy, and philosophy have received due attention; rhetoric, the art of letter-writing, metrical and poetical arts, likewise have been cultivated with assiduity; but few standard works are to be enumerated. Grammar and lexicography found their principal devotees in India; and of dictionaries, the *Ferhengi-Shiuri*, *Burhani Katiu*, and principally the *Heft Kulzum* (the Seven Seas), by the sultan of Oude, deserve attention. Translations from Greek, Indian, Arabic, Turkish, and other works into Persian, exist in great abundance, and some have paved the way to the knowledge of the original sources in Europe.—Chief authorities and writers on Persian Language and Literature are Meninsky, Richardson, Lumsden, Forbes, Ibrahim De Lacy, Hammer-Purgstall, Briggs, Jones, Duperron, Stewart, Quatremère, Wilken, Defrémery, Vullers, Iken, Kosegarten, Ouseley, Chodzko, Bland, Sprenger, Graff, Brockhaus, Dorn.

PER′SIAN POW′DER: preparation of the flowers of the composite plant, *Pyrethrum carneum* or *roseum*, dried and pulverized; efficacious in destroying noxious insects; and extensively used in Russia, Persia, and Turkey. It has been introduced into western Europe and the United States, both to rid houses of their insect pests, and to aid the horticulturist in protecting his plants. The plant is a native of the Caucasus, where the flowers are gathered wild, and sent to be manufactured chiefly at Tiflis. It might readily be cultivated in western lands, where its value for destroying moths alone would render it a profitable crop. Its habit is very similar to that of camomile.

PERSICOT, n. *pėr′sĭ-kŏt* [F. *persicot*—from L. *persĭcum*, a peach]: a liquor flavored with peach-kernels.

PERSIFLAGE, n. *pėr′sĭ-flâzh* [F.—from *persifler*, to quiz: connected with *siffler*, to whistle; L. *sibilare*]: light talk treating all subjects with banter. PERSIFLEUR′, n. *-flėr′*, one who indulges in persiflage; a banterer; a quiz.

PERSIGNY, *pėr-sēn′yĭ*, F. *pĕr-sē-nyē′*, JEAN GILBERT VICTOR FIALIN, DUC DE (proper name FIALIN): noted adherent of Emperor Napoleon III.: 1808, Jan. 11—1872, Jan. 11; b. at Saint-Germain-Lespinasse, dept. of Loire. He entered the *École de Cavalerie* at Saumur 1826, and obtained an appointment to the 4th regiment of hussars 1828. At this period Fialin was royalist in his politics; but he soon changed to a liberal, and was active in the July revolution. Insubordination, however, led to his expulsion from the army 1833. After a brief trial of Saint-Simonianism, Fialin was converted to the Bonapartist cause, dropped the name of Fialin, and took up that of P. (from a 'hereditary estate'), with the title Vicomte. Introduced to Louis Napoleon by the ex-king Joseph, he at once formed intimate relations with the prince, and began a career of Bonapartist propagandism throughout France and Germany, evincing extraordinary energy, pertinacity, and fertility of resource. He had the chief hand in the affair of Strasbourg, and subsequently apologized for its humiliating failure in a pamphlet, *Relation de l'Enterprise du Prince Napoleon Louis* (Lond. 1837), in which he throws the blame of the disaster on 'Fate.' He took part in the descent on Boulogne, where, like his master, he had the misfortune to be captured, and was condemned to 20 years' imprisonment. His confinement, however, after a short time, became almost nominal, and he beguiled his leisure by literary study, a partial result of which is in his voluminous memoir, addressed to the Institute, *Utilité des Pyramides d'Egyyte* (1844). On the breaking out of the revolution 1848, P. hurried to Paris, and set himself, with all his accustomed vigor and swiftness, to organize the Bonapartists. It is hardly too much to affirm that this dextrous agitator made his master pres. of the republic. He was then appointed aide-de-camp to the pres., and maj.gen. of the Parisian National Guard—perhaps with a view to future contingencies. In 1849 he was chosen a member of the legislative assembly, and immediately signalized himself in parliament by his absolute devotion to the policy of the Elysée. He was sent to Berlin as ambassador at the close of the same year, and afterward held other high diplomatic offices; was prominent in the *coup d'état* of 1851, Dec.; and 1852, Jan., succeeded De Morny as minister of the interior. On May 27 following, he married a granddaughter of Marshal Ney, when the pres. conferred on him the title *Comte*, and presented him with 500,000 francs. In 1855 he became ambassador at the English court, which office he held till 1858, and again 1859–60, leaving on both occasions a most favorable impression on English statesmen, by his talent and diplomatic tact. In the latter year, he was recalled, to assume the office of minister of the interior. He laid down the portfolio of this office 1863, June, when the elections in Paris and other large towns showed dissatisfaction with his policy; and in Sep. he was created duke. Thereafter he proved himself a zealous Bonapartist.

PERSIMMON, n. *pėr-sĭm′ŭn* [Amer. Indian name]: an Amer. tree and its fruit; *Dios′pyros virginĭā′nă*, ord. *Ebenācĕæ* (see DATE PLUM).

PERSIST, v. *pėr-sĭst′* [F. *persister*—from L. *persis′tĕrĕ*, to continue steadfastly—from *per*, through; *sisto*, I fix: It. *persistere*]: to continue steadily in any business or course commenced; not to give over; to perscvere. PERSIST′ING, imp. PERSIST′ED, pp. PERSIST′ENCE, n. *-ĕns*, or PERSIST′ENCY, n. *-ĕn-sĭ* [L. *persistens*, continuing steadfast]: steady perseverance in what has been undertaken; constancy in purpose or design; perseverance; obstinacy. PERSIST′ENT, a. *-ĕnt* [L. *persisten′tem*]: constant; continuing; remaining; in *bot.*, not falling off; remaining attached to the axis until the part which bears it is matured. PERSIST′INGLY, ad. *-lĭ*. PERSIST′IVE, a. *-ĭv*, in *OE.*, steady; persevering.

PERSIUS, *pėr′shĭ-ŭs* (AULUS PERSIUS FLACCUS): 34–62, Nov. 24; b. Volaterræ, Etruria: one of the four great Roman satirists—Lucilius, Horace, Persius, Juvenal. He was of distinguished equestrian family, was educated under the care of the Stoic, Cornutus, and lived on terms of intimacy with the most distinguished personages of his time in Rome, among whom were Lucan and Seneca. The principal authority for the life of P. is an abridgment of a 'commentary' by one Probus Valerius, which presents the character of the satirist in a most amiable light. Most modest and gentle in his manners, living affectionately with his mother, sister, and aunt, handsome in person, virtuous and pure in his whole conduct and relations, he stands out conspicuously from the mass of corrupt and profligate persons who formed the Roman 'society' of his age; and gained for himself the right to be severe, by leading a blameless and exemplary life. He died in youth, at one of his estates a few miles from Rome. His six Satires are usually printed with those of Juvenal. They were immensely admired in P.'s own day, and long afterward, through the middle ages. The church Fathers, Augustine, Lactantius, and Jerome, particularly were fond of them; but the estimate which modern critics have formed of his writings, is not quite so high. They are remarkable for the sternness with which they censure the corruption of morals then prevalent at Rome, contrasting it with the old Roman austerity and with the Stoic ideal of virtue. The language is terse, homely, and sometimes obscure, from the nature of the allusions and the expressions used, but his dialogues are the most dramatic in the Latin tongue. There is strong tendency to realism, and an unnecessary emphasis and an exaggerated detail, so that he ranks higher as moralist than as writer. The *editio princeps* appeared at Rome 1470; later editions are those of Isaac Casaubon (Par. 1605), Passow (Leip. 1809), Jahn (Leip. 1843), and Heinrich (Leip. 1844). P. has been frequently translated; as many as 14 English, 20 French, and considerably more German versions, being known. The two best English ones are by Dryden and Gifford.

PERSON, n. *pĕr'sŏn* [F. *personne*—from L. *persōna*, a mask, a character, a person: It. *persona*]: a human being; a living soul; an individual of a race or order above the animal (see PERSON, below): one's self; one: the body: character in a play: in *gram.*, one of the three states of a verb as modified by its nominative, representing respectively the speaker, that which is spoken to, and that which is spoken of; the quality of the noun or pronoun which modifies the verb: in *theol.*, specifically a term applied to each of the three distinctions in the Godhead (see PERSON, below: also TRINITY, DOCTRINE OF THE). PER'SONABLE, a. *-ă-bl*, of good appearance; handsome. PER'SONAGE, n. *-āj* [F. *personnage*]: a man or woman of eminence or distinction: exterior appearance; an individual. PER'SONAL, a. *-ăl* [F. *personnel*, personal —from L. *personālis*]: pertaining to men or women, not to things; peculiar or proper to him or to her: applying directly to one's character or conduct, as, personal remarks: exterior: in *gram.*, denoting the three persons of the verb: movable, not real. PER'SONALLY, ad. *-lĭ*, in person; not by representative; particularly. PER'SONAL'ITY, n. *-ăl'ĭ-tĭ*, that which constitutes distinction of person; individuality (see PERSON, below): reflection upon individuals, as upon their private actions or character. PERSONAL ACTIONS, in *law*, actions brought to try the right to damages for breach of contract, or for injuries to the person or personal estate; in distinction from real actions, designed to try the right and title to real property. PERSONAL ESTATE OR PROPERTY, every species of property except real estate—i.e., lands and houses: see DISTRIBUTIONS, STATUTE OF: CHATTELS: FIXTURES. Title to personal property is acquired through occupancy; through transfer by act of the party, e.g., by sale; through transfer by act of the law, e.g., by judgment; through prescription; and through accession: see PERSONALTY. PERSONAL EXCEPTION, in the *Roman law*, a ground of objection which applies to an individual, and prevents him doing something which, but for his conduct or situation, he might do. The term is adopted in the law of Scotland. In other systems of law, it is called usually estoppel. PERSONAL IDENTITY, in *metaph.*, our sameness of being at every stage of life, of which consciousness gives us the evidence. PERSONAL PRONOUN, in *gram.*, one of the pronouns, I, thou, he, she, it, and their plurals. PERSONAL REPRESENTATIVES, the executors or administrators of a person deceased. PER'SONALIZE, v. *-ăl-īz*, to make personal. PER'SONALIZING, imp. PER'SONALIZED, pp. *-īzd*. PER'SONALTY, n. *-ăl-tĭ*, in *English law*, all the property which, when a man dies, goes to his executor or administrator, as distinguished from the realty, which goes to his heir-at-law. Personalty consists of money, furniture, stock in the funds; while realty consists of freehold land and rights connected with land: see PERSONAL ESTATE: DISTRIBUTIONS, STATUTE OF: INTESTACY: KIN, NEXT OF. PER'SONATE, a. *-āt* [L. *persōnātus*, provided with a mask]: in

bot., a form of monopetalous corolla where the orifice of the tube is closed by an inflated projection of the throat, the whole resembling a gaping mask: V. to assume the character of another, and in such a way as to pass for that person; to counterfeit; to feign; to play a fictitious character; in *OE.*, to celebrate loudly. PER′SONATING, imp.; in *OE.*, celebrating loudly. PER′SONATED, pp.: ADJ. counterfeit; fictitious. PER′SONA′TOR, n. *-tėr*, one who assumes a fictitious character. PER′SONA′TION, n. *-shŭn*, the act of assuming the character of another; representation. PERSONIFY, v. *pėr-sŏn′ĭ-fī*, to ascribe to a thing the sentiments, actions, or language of a human being. PERSON′IFYING, imp. PERSON′IFIED, pp. *-fīd.* PERSON′IFIER, n. *-fī-ėr*, one who personifies. PERSON′IFICA′TION, n. *-fī-kā′shŭn* [F. *personnification*]: the act of personifying; in *rhet.*, a figure (called by the Greeks *Prosopopœia*) by which inanimate objects, or mere abstract conceptions, are invested with the forms and attributes of conscious human life. Oratory and poetry often derive great power and beauty from the employment of this figure. Nowhere do we find more sublime examples than in the Hebrew Scriptures, e.g., 'The sea *saw* it, and fled.' Such abstract conceptions as Wisdom, Justice, Charity, are often personified in the gravest and most argumentative compositions. PER′SONNEL′, n. *-nĕl′* [F.]: designating in an army or navy the officers and soldiers or sailors, i.e., persons employed in distinction from the *matériel* [F.], which comprises the guns, provisions, wagons, and stores of every description: the term is applied similarly to other public services, also in reference to extensively organized private undertakings. IN PERSON, by one's self; not by representative. THE PERSON, the body. *Note.*—L. *persōna* was primarily the large-mouthed mask worn by an ancient actor, and was so named from the resonance of the voice sounding through it—from L. *persŏnārĕ*, to sound through—from *per*, through; *sŏno*, I sound.

PER′SON [L. *persōna*, a mask] has come, from its original signification, to be applied to the individual wearing the mask, and thus to mean in general an individual, or a numerically distinct being, of a race or order above the animal. Beyond the idea of individuality, it involves that of a sentient, intelligent, and moral subsistence (e.g., a human being), in which it differs from 'substance' or 'thing.' The theological use of the word, though directly based on its philosophical signification, is made difficult of apprehension from its being used—for lack of any adequate term—in the statement of the Christian doctrine of the Trinity, which in itself involves a mystery. Hence, when theologians declare that there are 'Three Persons in one God,' their meaning may take a various shading: some intend to convey strictly that each of the Three Persons is a Being individually subsisting and numerically distinct; and the difficulty of apprehension they refer not to these terms, but to the reconciliation of the numerical distinction of

Persons with the unity of the Divine Being. From this, which in general has been historically the standard Trinitarian use of the word Person, various modifications have been developed among those who still firmly hold to the scriptural revelation of God under the threefold distinction grounded in His eternal Being. Many of these, and in recent years probably an increasing number, deem the word Person applicable only approximately to express the transcendent mystery which is necessarily involved, and incline rather to the term Distinction or the ancient *Hypostasis* (subsistence); or seek what they deem a more scriptural statement of the great fact in the simple declaration that God eternally subsists, and reveals himself to man, as the Father and the Son and the Spirit—One God.

The name *Persona*, Person, was applied to the Trinity first by the Latins; the corresponding Greek word, *Prosōpon*, being of later use. The earlier Greek Fathers used the word *Hypostasis*, substance or subsistence, where the Latins used *Persona*, and considerable controversy for a time grew out of this diverse use. It became apparent, however, that the difference was but of words; and after the condemnation of the Sabellian heresy (see SABELLIUS), and still more after the Council of Nicæa, the controversy turned from the words to the substance of the doctrine, in the well-known form of the Arian controversy: see ARIUS: also CHRIST, THE: TRINITY DOCTRINE OF THE.

PERSPECTIVE, n. *pėr-spĕk′tĭv* [F. *perspective*, perspective—from L. *perspec′tus*, clearly perceived—from *per*, through; *specĭo*, I look: Sp. *perspectiva*, perspective]: view or prospect: art of drawing on paper or canvas, etc., pictures of objects or scenery as they appear to the eye from any given point, either real or imaginary (see below): a pocket-telescope: ADJ. pertaining to or according to perspective. PERSPEC′TIVELY, ad. *-lĭ*. PERSPEC′TOGRAPH, n. *-tō-grăf* [Gr. *graphō*, I write]: an optical instrument for mechanical drawing. AERIAL PERSPECTIVE, the faintness of outline and blending of colors produced by the thicker or thinner stratum of air which pervades the optical image viewed, the delineation of which requires, on the part of the artist, a careful study of nature. LINEAR PERSPECTIVE, the principles of geometry applied to the accurate delineation of the chief lines of a picture (see PERSPECTIVE, below).

PERSPEC′TIVE: art of representing natural objects upon a plane surface in such a manner that the representation shall affect the eye in the same way as the objects themselves. The distance and position of objects affect both their distinctness and apparent form, giving rise to a sub-division of P. into *linear perspective*, which, as its name denotes, considers exclusively the effect produced by the position and distance of the observer upon the apparent *form* and *grouping* of objects; while *aerial perspective* confines itself to their *distinctness*, as modified by distance and light. The necessity of attending to the principles of P. in all pictorial drawing is apparent when we consider, e.g., that a circle, seen obliquely, appears to be not a circle, but an ellipse, with its shortest diameter in line with the spectator, and its longest at right angles to this. A square, seen from a position opposite the centre of one of its sides, appears as a trapezoid, the sides which are perpendicular to the direction of vision appearing to be parallel, while the other two appear to converge to a point in front of the spectator, etc. For the same reason, two rows of parallel pillars of equal height, seen from a point between and equidistant from each row, appear not only to converge at the further end, but to become gradually smaller and smaller. An excellent idea of a P. plan can be easily obtained by interposing a vertical transparent plane (as of glass—a window, e.g.) between the observer and the objects of his vision, and supposing that the objects which he sees are seen not *through* the glass, but painted *on* it. A sketch made on a glass plane in this position by following with a pencil all the lines and shades of the objects seen through it, the eye being all the time kept quite steady, would form a picture in perfect perspective. In practice, however, it is found, unfortunately, that glass is not a suitable material for sketching on, and that the vertical position is not the most convenient; it is therefore preferable to make a careful study of the effects produced by change of position and distance on the appearance of objects in

nature, and from the results of this to compile a body of rules, by the observance of which painters may be enabled to produce an effect true to nature. After the 'scope' (i.e., the number of objects to be introduced, and the distance at which they are to be viewed) of the picture has been determined, and before the design is commenced, it is necessary to draw upon the P. plan three lines: 1. The *base-line*, or *ground-line*, which limits the sketch toward the operator, and is the base-line of the picture. 2. The *horizontal line*, which represents the ordinary position of the sensible horizon. The height of the horizontal line is about one-third of the height of the picture, when the sketcher is placed at or little above the level of the horizon; but it may rise in a degree corresponding to his increase of elevation, till it reaches near to the top of the P. plan. The general rule is to have a high horizontal line when the view is taken, or supposed to be taken, from an eminence; but when the station is on a level, either actual or assumed, as is the case when a statue or a mountainous landscape is figured, the horizontal line must be low. The horizontal line in nearly all cases is supposed to be level with the spectator's eye. 3. The *vertical line*, which is drawn from the supposed position of the sketcher, perpendicular to the *ground* and *horizontal* lines, meeting the latter in a point which is called the *point of sight*, or centre of the picture. The vertical line has no representative in nature, and is merely a mechanical adjunct to the construction of the picture, all vertical lines in nature being parallel to it in the picture. The point of sight, being the point directly opposite to the observer, is properly placed in the centre of the picture, for it is most natural that the view should lie symmetrically on each side of the principal visual line; but this is not at all a universal rule, for we very frequently find it on the right or left side, but always, of course, on the horizontal line. All lines which in nature are perpendicular to the ground-line, or to a vertical plane raised upon it as a base, meet in the point of sight, which is thus their *vanishing point* (see the line of the tops and bottoms of the pillars in fig. 1).

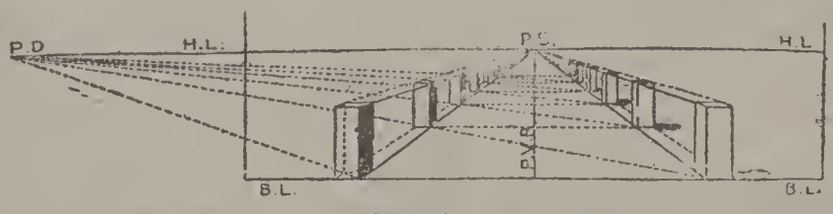


Fig. 1.
Illustrating the more important points and lines; PVR is the principal visual ray.

The *points of distance* are two points in the horizontal line on each side of the point of sight, and in a 'direct' sketch are at a distance from it equal to the horizontal distance of the sketcher's eye from the ground-line. The equality of distance of these points from the point of sight is not, however, necessary, as it occurs only in

those cases where the lines, of which the points of distance are the *vanishing points*, are inclined (in nature) at an angle of 45° to the base-line; but, in all cases, the two points of distance are about twice as far apart as the eye is from the picture. One important use of the points of distance is to define the distance of objects in a row (fig. 1) from each other. For this purpose, two points of distance are not necessary, as, when the position of one pillar is found, that of the one opposite is at once obtained by drawing a line parallel to the base or ground-line. We have seen that the point of sight is the vanishing point of all level lines which meet the ground line or a vertical plane on it at right angles, and that the points of distance (in a *direct* picture) are the vanishing points of all lines which cut the ground-line at an angle of 45°; but there are many other groups of parallel lines in a picture which have different situations, and therefore different vanishing points. Such lines with their vanishing points (called, for distinction's sake, *accidental points*) are represented in fig. 2. If the accidental point is above the horizontal line, it is called the *accidental point aerial*—if below, the *accidental point terrestrial;* and a little consideration makes it evident that these points may or may not be situated within the plane of the picture. Such are the points and lines necessary for the construction of a plan in true P.; and from the above explanation, we may deduce the two general principles: 1, That all parallel straight lines in nature are no longer parallel when projected on the P. plane, but meet in a point which is called the vanishing point, and is some one of the three above described, unless these lines happen to be also parallel to the ground-line or the vertical line, in which case they re-

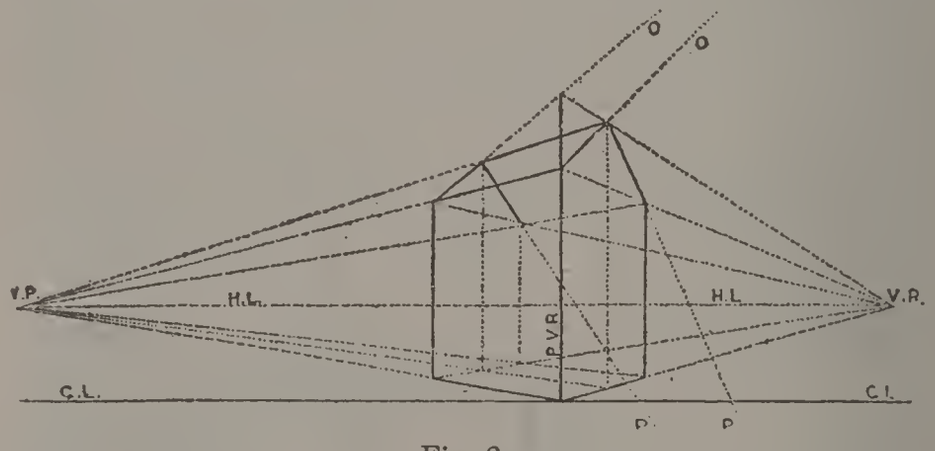


Fig. 2.

The lines O O converge to the accidental point aerial, and P P to the accidental point terrestrial.

main parallel when transferred to the picture; and 2, That since the bodies drawn below the horizontal line are seen as if from above, those above as if from below, and those to the right and left of the point of sight as if observed from the left and right, it follows, that straight lines which in the picture are above the horizontal line lower themselves, while those below raise

themselves to it; those to the left, following the same law, direct themselves to the right, and *vice versa.*

Aerial perspective consists in a modulation of the brightness and colors of objects in accordance with the state of the atmosphere, the depth of the body in the P. plane (i.e., distance in nature from the ground-line), and other accidents of place and time. As the distance of objects increases, their illuminated parts are made less brilliant, and their shaded parts more feeble. The bluish tint imparted by a large mass of the atmosphere to the bodies seen through it is frequently imitated by the mixing of a slight tint of blue with the colors to be applied; a yellow object thus assumes a greenish tint; a red one, a violet tint, etc. The air, when charged with vapor, is represented by a diminution of the brightness of colors, and by the grayish tint imparted to them. But in this part of the subject, rules are of little avail, for experience alone can guide the painter in faithfully copying the myriad aspects presented by nature.

A thorough knowledge of P. is a *sine qua non* to the painter or designer, and though many are inclined to think it a superfluity, and that the sketcher has only to make use of his eyes, and copy justly, the very fact that such is their opinion shows that they have never made the attempt; for it is impossible for the painter, and much more so for the designer, to execute a copy of nature with sufficient accuracy by the sole aid of the eye and hand, a fact unfortunately too frequently proved by many of the sketches exhibited in fine-art collections. P. was known to the ancients, but seems to have become a lost art during the disturbances that convulsed Italy; and was revived by Albert Dürer, Pietro del Borgo, and Bramantino of Milan (1440), whose body of rules was extended and completed by Peruzzi and Ubaldi about 1600. Dr. Brook Taylor was the first Englishman who discussed the subject scientifically. Works on P. are now abundant in every language.—See PROJECTION.

PERSPICACIOUS, a. *pėr'spĭ-kā'shŭs* [F. *perspicace*, perspicacious; L. *per'spĭcax* or *perspĭcā'cem*, penetrating, acute; *perspĭcĭo*, I look thoroughly or closely at—from *per*, through, and *specĭo*, I look: It. *perspicace*]: sharp of sight; of acute discernment or understanding. PER'SPICA'CIOUSLY, ad. *-lĭ.* PER'SPICA'CIOUSNESS, n. *-shŭs-nĕs*, or PER'SPICAC'ITY, n. *-kăs'ĭ-tĭ* [F. *perspicacité*—from L. *perspicacitātem*]: quickness of sight or acuteness of discernment. PERSPICUOUS, a. *pėr-spĭk'ū-ŭs* [L. *perspic'uus*, clear]: easily understood; clear to the mind; plain; evident; obvious. PERSPIC'UOUSLY, ad. *-lĭ.* PERSPIC'UOUSNESS, n. *-nĕs*, or PERSPICUITY, n. *pėr'spĭ-kū'ĭ-tĭ*, easiness to be understood; plainness; distinctness; that quality in language which presents with great plainness to the mind of another the precise ideas of a writer or speaker; lucidity.—SYN. of 'perspicuity': clearness; perspicuousness; transparency; translucency.

PERSPIRE, v. *pėr-spīr′* [L. *perspirārĕ*, to breathe through or everywhere—from *per*, through; *spīro*, I breathe]: to sweat; to emit or exhale through the pores of the skin. PERSPIR′ING, imp. PERSPIRED′, pp. *-spīrd.* PERSPIR′ABLE, a. *-ră-bl*, that may be perspired. PERSPIRATION, n. *pėr′spĭ-rā′shŭn* [F.—L.]: sweat; evacuation of moisture through the pores of the skin; matter perspired (see SWEAT). PERSPIRABILITY, n. *pėr-spīr′ă-bĭl′ĭ-tĭ*, the quality of being perspirable. PERSPIR′ATIVE, a. *-ă-tĭv*, or PERSPIR′ATORY, a. *-ă-tėr-ĭ*, performing the act of perspiration.

PER STIRPES, *pėr stėr′pēz* [L. by descents]: term in law, denoting division of an inheritance among descendants according to their degrees of nearness of descent from or kinship to a testator or a person dying intestate: see PER CAPITA.

PERSUADE, v. *pėr-swād′* [F. *persuader*—from L. *persuādērĕ*, to persuade—from *per*, thoroughly; *suādĕo*, I advise: It. *persuadere*]: to influence by advice or argument; to draw or incline a person by presenting powerful motives to the mind; to convince by argument or entreaty. PERSUA′DING, imp. PERSUA′DED, pp. convinced; induced. PERSUA′DER, n. *-dėr*, one who persuades. PERSUA′DABLE, a. *-dă-bl*, capable of being persuaded. PERSUA′SIVE, a. *-swā′sĭv* [L. *persuāsus*, persuaded: F. *persuasif*, persuasive]: having power to persuade; influencing the mind or passions: N. that which persuades; an incitement. PERSUA′SIVELY, ad. *-sĭv-lĭ.* PERSUA′SIVENESS, n. *-nĕs*, the quality of being persuasive. PERSUA′SORY, a. *-sėr-ĭ*, having the power or tendency to persuade. PERSUA′SION, n. *-shŭn* [F.—L.]: the act of persuading; state of being persuaded; settled opinion or conviction; a religious sect or party adhering to a certain creed or system. PERSUA′SIBLE, a. *-sĭ-bl*, that may be influenced by reasons offered. PERSUA′SIBLENESS, n. *-bl-nĕs*, the quality of being persuasible. PERSUA′SIBIL′ITY, n. *-bĭl′ĭ-tĭ*, capability of being persuaded.—SYN. of 'persuade': to induce; convince; convict; exhort; entice; allure; prevail on; win over; advise.

PERSULPHATE, n. *pėr-sŭl′fāt* [L. *per*, thoroughly, and Eng. *sulphate*]: a sulphate of the peroxide of any base. PERSUL′PHURET, n. *-fū-rĕt* [L. *per*, and *sulphuret*]: the sulphide which has the largest proportion of sulphur.

PERT, a. *pėrt* [W. *pert*, smart, fine; *perten*, a smart little girl; *percu*, to trim, to smarten (see PERK)]: having the quality of liveliness carried to excess; forward; indecorously free; saucy. PERT′LY, ad. *-lĭ.* PERT′NESS, n. *-nĕs.* forwardness; sauciness. *Note.*—In OE. *pert* is sometimes employed in the sense of 'evident; open,' being here a corruption of F. *apert*, L. *apertus*, open.

PERTAIN, v. *pėr-tān′* [OF. *partenir*, to pertain—from L. *pertinērĕ*, to reach or extend to—from *per*, through; *tenĕō*, I hold: It. *pertenere*]: to be the property, right, or duty of; to concern; to have relation to. PERTAI′N′ING, imp. PERTAINED′, pp. *-tānd′.*

PERTEREBRATION, n. *pėr'tĕr-ĕ-brā'shŭn* [L. *perterĕbrātus*, bored through—from *per*, through; *terĕbrō*, I bore; *terebra*, a borer—from *tero*, I grind]: the act of boring through.

PERTH, *pėrth:* city, royal, municipal, and parliamentary burgh, cap. of the Scotch county of P. or Perthshire (q.v.); on the right bank of the Tay, 45 m. n.n.w. of Edinburgh by railway (through Fife). The charming scenery of the immediate vicinity, the Tay, a broad and noble river, sweeping southward along the e. side of the city, and the superb background of the Grampians on the north, give interest and beauty to the site of the 'Fair City;' while its rank as in some sort the ancient metropolis of Scotland, its important part in the history of the country, and the picturesque associations with which history and fiction have invested it, give it good rank among Scotch cities. A handsome bridge of nine arches, 880 ft. in length, and stretching over a water-way 590 ft. in width, connects the town with the suburb of Bridgend, on the left bank of the river. Further down, the Perth and Dundee railway crosses the river on a fine stone and iron bridge, which admits foot-passengers also. The appearance and salubrity of P. are much enhanced by two beautiful public parks, called the North and South Inches. The water supply, obtained from the Tay, is filtered, raised by steam into two elevated reservoirs, and thence distributed over the town, rising to the upper stories of the highest houses. Among the interesting public buildings are the Church of St. John, an ancient structure in the Pointed Style, surmounted by a massive square tower; the County Buildings, a Grecian edifice: the Town-house (part of which is as old as 1210); King James VI.'s Hospital; the Infirmary; and the local prison. At the head of the South Inch stands the Penitentiary, or General Prison, one of the largest buildings of the kind in Scotland, where all criminals sentenced to imprisonment for long periods are confined. The town contains a statue of the late Prince Consort; Marshall's Monument, erected in honor of a former lord provost, and containing a public library and the Museum of the Antiquarian Soc.; the public seminaries, Sharp's and other educational institutions. The river is navigable to P. for vessels of considerable burden. The linen and wincey manufactures are thriving. There are dye-works, iron-foundries, breweries, etc.; but ship-building has declined. The salmon-fishery on the Tay is very valuable, the rental being more than £15,000. In 1880, 204 vessels, of 16,573 tons, entered and cleared the port. Six fairs are held annually, and horse-races take place every year on the North Inch. P. has a charter as a royal burgh from King William the Lion (1165–1214). It returns a member to the house of commons. Pop. (1881) of royal and parliamentary burgh 28,948; (1901) 32,872. There are more than 20 places of worship. The city revenue 1879-80 was £7,380.

PERTH: city, cap. of W. Australia and of P. co.; on the Swan river, 12 m. from its mouth, about 1,700 m. from Melbourne. A military force is constantly stationed here, and a large number of convicts are confined in the prisons. The Rom. Cath. and Anglican churches each has a bishop at P. There are some very fine buildings, including a mechanics' institute, the palace of the governor, and a city hall erected by convict labor. The Victoria Mts. are near, and the scenery is remarkably picturesque. The city was incorporated 1856. Pop. (1901) 36,274.

PERTH, FIVE ARTICLES OF: memorable in the ecclesiastical history of Scotland; articles agreed on in a meeting of the gen. assembly of the Church of Scotland, convened at Perth, by command of James VI., 1618, Aug. 25. These Articles enjoined kneeling at the Lord's Supper, observance of Christmas, Good Friday, Easter, and Pentecost, and of the rite of confirmation, and sanctioned private administration of baptism and of the Lord's Supper. They were highly obnoxious to the Presbyterians of Scotland, not only on their own account, but as part of an attempt to change the whole constitution of the church, and because they were adopted without free discussion in the assembly, and in mere compliance with the will of the king, who was also regarded as having unduly interfered with the constitution of the assembly itself. They were, however, ratified by the parliament 1621, Aug. 4—a day long remembered in Scotland as *Black Saturday;* and being enforced by the court of high commission, became one of the chief subjects of that contention between the king and the people which produced results so sad for both, in the subsequent reign. The gen. assembly at Glasgow, 1638, declared that of Perth to have been 'unfree, unlawful, and null,' and condemned the Five Articles.

PERTH AMBOY, *pėrth ăm-boy':* city and port of entry in Middlesex co., N. J.; on the Central railroad of New Jersey, the Lehigh Valley and the Pennsylvania railroads, and on the Raritan Bay, 21 m. from New York. It is well supplied with churches and schools; has a girls' seminary, one daily and two weekly newspapers, a state bank (cap. $35,000), and a savings bank. It has an excellent harbor and considerable foreign commerce. The manufactures include cork, white ware, fire-brick, building brick, and iron castings, and there are extensive terra-cotta works. The first houses were built 1683, and a court-house was built 1695. There are records of a town govt. 1718, and articles of incorporation were obtained 1784. Pop. (1870) 2,861; (1880) 4,808; (1890) 9,512; (1900) 17,699; (1910) 32,121.

PERTHES, *pĕr'tĕss*, Friedrich Christoph: eminent German publisher; 1772, Apr. 21—1843, May 18; b. Rudolstadt. In his 15th year, he was apprenticed to a Leipsic bookseller, with whom he remained six years, giving much of his leisure to study. In 1793 he passed into the establishment of Hoffmann, the Hamburg bookseller; and 1796 started business on his own account; and, by his appreciation of the public wants, his diligence, and his integrity, he ultimately made it one of the most extensive publishing concerns in modern Germany. During the first few years of his Hamburg apprenticeship, his intimate friends had been either Kantian or skeptical in their opinions; and P., who had no great learning or speculative talent, had learned to think with his friends; but a friendship which he subsequently formed with Jacobi (q.v.), and the Holstein poet and humorist, Matthias Claudius, led him into a serious though liberal Christianity. The iron rule of the French in n. Germany, and the prohibition of intercourse with England, nearly ruined trade; yet P., even in this great crisis, found ways to extend his dealings. He endeavored to enlist the intellect of Germany on the side of patriotism, and 1810 started the *National Museum*, with contributions from Jean Paul Richter, Count Stolberg, Claudius, Fouqué, Heeren, Sartorius, Schlegel, Görres, Arndt, and other eminent men. Its success was far beyond P.'s expectations, and encouraged him to continue his patriotic activity, till Hamburg was formally incorporated with the French empire. He subsequently was prominent in forcing the French garrison to evacuate Hamburg, 1813, Mar. 12; and on its reoccupation by the French, he was one of the *ten* Hamburgers specially excepted from pardon. After peace had been restored to Europe, P. steadily applied himself to the extension of his business, and to the consolidation of the sentiment of German national unity, as far as that could be accomplished by literature and speech. In 1822, transferring his Hamburg business to his partner Besser, he removed to Gotha, where he published mainly great historical and theological works. His subsequent correspondence with literary, political, and theological notabilities—e.g., Niebuhr (one of his dearest friends), Neander, Schleiermacher, Lücke, Nitzsch, Tholuck, Schelling, and Umbreit—is extremely interesting, and throws a rich light on the recent inner life of Germany.—See *Friedrich Perthes' Leben* (12th ed. 1853), by his second son, Clemens Theodor P., prof. of law at Bonn—d. 1867.—The uncle of Friedrich Christoph P. was Johann Georg Justus P. (d. 1816), who established a publishing and bookselling house at Gotha 1785, which has acquired, in the hands of his sons, a great reputation, and from which issues the famous *Almanach de Gotha*.

PERTHSHIRE, *pėrth'shėr:* important inland county in Scotland; bounded s. by the shires of Stirling and Clackmannan; n. by Inverness and Aberdeen; w. by Argyle and Dumbarton; e. by Forfar, Fife, and Kinross. It extends from e. to w. about 70 m., and n. to s. about 66 m.; 2,834 sq. m., or 1,814,063 acres, of which more than 32,000 are covered with water. It is divided into the Highland and Lowland districts, the former occupying much the larger surface; and these are sub-divided into 10 divisions—viz., Menteith, Strathearn, Gowrie, Stormont, Strathardle, Glenshee, Athole, Breadalbane, Rannoch, and Balquidder. P. has a comparatively mild climate; and the soil, in Strathearn, Carse of Gowrie, and less extensive tracts, being mostly a rich loam, crops of many kinds are brought to utmost perfection. These districts are also famed for fruit and floral production. P. is not less distinguished for its magnificent mountain, lake, and river scenery. The Grampians here attain nearly their maximum height, Ben Lawers within a few ft. of 4,000, Ben More 3,843, and several others above 3,000. The lakes are numerous, the principal of which are Lochs Tay, Ericht, Rannoch, Tummel, Lydoek, Garry, Lyon, and Doehart. There are several streams of note, the principal being the Tay, which is fed by numerous other streams, and is said to discharge as much water into the sea as any other river in the kingdom. These lakes and streams afford excellent fishing, and the Tay is valuable for its salmon, yielding in rent about £15,000 a year.

The monuments of antiquity in this county afford an interesting field of investigation. Lying n. of the Roman wall, P. comprises the scenes of the last struggle for independence, which the inhabitants of the Lowland districts of Scotland made against those formidable enemies who were regarded as invincible. The last battle fought by the Caledonians against the Romans was at Mons Gramp, or rather, as it should be read, Granp, supposed to be indicated by the great camp at Ardoch, between Dunblane and Crieff, and which does not at all seem connected with the Grampian range. In this final struggle, the result of which was that the Lowlanders were defeated, Agricola commanded the conquering host, and the Caledonians were led by a chief named *Galgacus.*

The chief towns of P. are Perth, Coupar-Angus, Auchterarder, Crieff, Dunblane, and Blairgowrie. According to agricultural statistics (1881), the number of acres under all kinds of crops, bare fallow, and grass, was 345,788; under corn crops, 105,013; under green crops, 53,303; clover, sainfoin, and grasses under rotation, 100,-451; permanent pasture and meadow land (exclusive of heath or mountain land), 84,823. Horses used for agriculture, etc., 14,328; cattle, 76,634; sheep, 675,081; pigs, 7,741. The valued rent of P. for 1674 was equal to £28-330; for 1879–80, £890,995—exclusive of £110,047 for railways and water-works. The rate of mortality is low. The county returns two members to parliament.

The Old Red Sandstone, granite, and slate abound. In this county are some of the stateliest mansions of Scotland, but, except Scone Palace, none contain any historical memorials; and objects of antiquarian interest more recent than Roman roads and camps are the Cathedrals of Dunblane and Dunkeld, and the Abbey of Culross. There are two royal burghs, Perth and Culross, besides which are several villages of considerable size, with some trade in flax, etc. Pop. (1891) 126,128; (1901) 123,283.

PERTINACIOUS, a. *pėr'tĭ-nā'shŭs* [L. *pertinax* or *pertĭnācem*, that holds very fast—from *per*, thoroughly; *tenax*, tenacious—from *tenĕō*, I hold: It. *pertinace*]: unyielding; firm; resolute; adhering with fixed resolution or obstinacy, as to an opinion. PER'TINA'CIOUSLY, ad. *-lĭ*. PER'TINA'CIOUSNESS, n. *-shŭs-nĕs*, or PER'TINAC'ITY, n. *-năs'ĭ-tĭ*, firm or unyielding adherence to opinion or purpose; steady resolution or perseverance; obstinacy.—SYN. of 'pertinacious': obstinate; determined; stubborn; inflexible; resolute; constant; steady.

PERTINAX, *pėr'tĭ-năks*, HELVIUS: Roman emperor: A.D. 126, Aug. 1—193, Mar. (reigned 192, Dec. 31—193, Mar.); b., according to Dio Cassius, at Alba Pompeia, a Roman colony of Liguria. He rose through various grades in military service, to the command of the first legion; in 179 was chosen consul, and was gov. successively of several provinces. Being sent to command the turbulent legions in Britain, he, against his will, was proclaimed by them emperor; on which he solicited to be recalled, and was appointed proconsul of Africa, prefect of Rome, and consul (a second time) 192. The assassins of Emperor Commodus almost forced P. to accept the purple, which with great hesitation he did but he was unable to gain over the pretorian guard. His accession was, however, hailed with delight by the senate and people, who were rejoiced to have, as ruler, an able captain, instead of a ferocious debauchee; and P., encouraged by this favorable reception, planned various reforms; but was attacked by a band of the rebellious pretorians, two months and twenty-seven days after his accession; and disdaining to flee, was slain, and his head carried about the streets of Rome in triumph.

PERTINENT, a. *pėr'tĭ-nĕnt* [F. *pertinent*—from L. *pertinens* or *pertĭnen'tem*, reaching or extending to—from *per*, through; *tenĕō*, I hold: It. *pertinente*]: just to the purpose; to the point; relating to the subject or matter in hand; relevant; equivalent to the French term, *à propos*. PER'TINENTLY, ad. *-lĭ*. PER'TINENCE, n. *-nĕns* [F.—L.], or PER'TINENCY, n. *-nĕn-sĭ*, justness of relation to the subject or matter in hand; suitableness.—SYN. of 'pertinent': fit; proper; suitable; appropriate: apposite.

PERTURB, v. *pėr-tėrb'* [F. *perturber*, to perturb—from L. *perturbārĕ*, to throw into utter confusion, to embarrass—from *per*, thoroughly; *turbārĕ*, to disturb: It. *perturbare*]: to trouble or disquiet; to put out of regularity; to cause to deviate from an elliptic orbit. PERTURB'ING, imp. PERTURBED', pp. *-tėrbd':* ADJ. agitated; disquieted. PERTURBATION, n. *pėr'tėr-bā'shŭn* [F.—L.]: disquiet of mind; restlessness and disorder of the mind; commotion of the passions; confusion; cause of disquiet.

PERTURBA'TIONS OF THE PLANETS, in Physical Astronomy: deviations of the planets from their regular elliptic courses; produced in the motion of one heavenly body about another, by the action of a third body, or by the non-sphericity of the principal body. Thus, e.g., were there no bodies in space except the earth and moon, the moon would describe accurately an ellipse about the earth's centre as focus, and its radius vector would pass over equal areas in equal times—but only if both bodies were homogeneous and truly spherical, or had their constituent matter otherwise so arranged as to attract each other as if each were collected at some definite point of its mass. The oblateness of the earth's figure, therefore, produces P. in what would otherwise be the fixed elliptic orbit of the moon. Again, when we consider the sun's action, it is obvious that in no position of the moon can the sun act equally on both earth and moon; for at new moon, the moon is nearer to the sun than the earth is, and is therefore more attracted (in proportion to its mass) than the earth—that is, the *difference* of the sun's actions on the earth and moon is equivalent to a force tending to draw the moon away from the earth. At full moon, on the other hand, the earth (in proportion to its mass) is more attracted than the moon is by the sun; and the perturbing influence of the sun is again of the nature of a force tending to separate the earth and moon. About the quarters, on the other hand, the sun's attraction (mass for mass) is nearly the same in amount on the earth and moon, but the *direction* of its action is not the same on the two bodies, and it is easy to see that in this case the perturbing force tends to bring the earth and moon nearer to each other. For any given position of the moon, with reference to the earth and sun, the *difference* of the accelerating effects of the sun on the earth and moon is a disturbing force; and it is to this that the P. of the moon's orbit, which are the most important, and among the most considerable, in the solar system, are due. [By the word *difference* is understood, not the arithmetical difference, but the resultant of the sun's direct acceleration of the moon, combined with that of the earth reversed in direction and magnitude; as it is only with the *relative* motions of the earth and moon that the calculation is concerned.] This disturbing force may be resolved into three components—e.g., we may have one in the line joining the earth and moon, another parallel to the plane of the ecliptic, and perpendicular to the moon's

radius vector, and a third perpendicular to the plane of the ecliptic. The first component, as noted above, tends to separate the earth and moon at new and full, and to bring them closer at the quarters; but during a whole revolution of the moon, the latter tendency is more than neutralized by the former—that is, in consequence of the sun's disturbing force, the moon is virtually less attracted by the earth than it would have been had the sun been absent. The second component tends mainly to accelerate the moon's motion in parts of its orbit, and to retard it at others. The third component tends, on the whole, to draw the moon toward the plane of the ecliptic. We cannot, of course, enter here into even a complete sketch of the analysis of such a question as this; but one or two very simple considerations may be given, which will indicate the nature of the grand problem of perturbations.

The method, originally suggested by Newton, and found, on the whole, most satisfactory in these investigations, is called the *Variation of Parameters*, and admits of very simple explanation. The path which a disturbed body pursues is, of course, no longer an ellipse, nor is it in general either a plane curve or re-entrant. But *it may be considered to be an ellipse which is undergoing slow modifications in form, position, and dimensions, by the agency of the disturbing forces.* In fact, it is obvious that any small arc of the actual orbit is a portion of the elliptic orbit which the body would pursue forever afterward if the disturbing forces were suddenly to cease as it moved in that arc. The *parameters*, then, are the elements of the orbit—that is, its major axis, eccentricity, longitude of apse, longitude of node, inclination to the ecliptic, and epoch; the latter quantity indicating the time at which the body passed through a particular point, as the apse, of its orbit. If these be given, the orbit is completely known, with the body's position in it at any given instant. If there be no disturbing forces, all these quantities are constant; therefore, when the disturbing forces are taken into account, they change very slowly, as the disturbing forces are, in most cases, very small. To give an instance of the nature of their changes, let us briefly consider one or two simple cases. First, to find the nature of some of the effects of a disturbing force acting in the radius vector, and tending to draw the disturbed, from the central, body. Let S be the focus, P the nearer apse, of the undisturbed elliptic orbit. When the moving body passes the point M, the tendency of the disturbing force is to make it describe the dotted curve in the figure—i.e., the new direction of motion will make with the line MS an angle more nearly equal to a right angle than before; and therefore the apse Q in the disturbed orbit will be sooner arrived at than P would have been in the undisturbed orbit—that is, the apse *regredes*, or revolves in the contrary sense to that of M's motion. Similarly, the effect at M_1 is to make the apse regrede to Q_1. At M_2 and M_3, on

the other hand, the tendency is to make the apse progrede. Also, as the velocity is scarcely altered by such a force, the major axis remains unaltered. Thus at M the eccentricity is diminished, and at M_1 increased, since the apsidal distance is increased at M, and diminished at M_1.

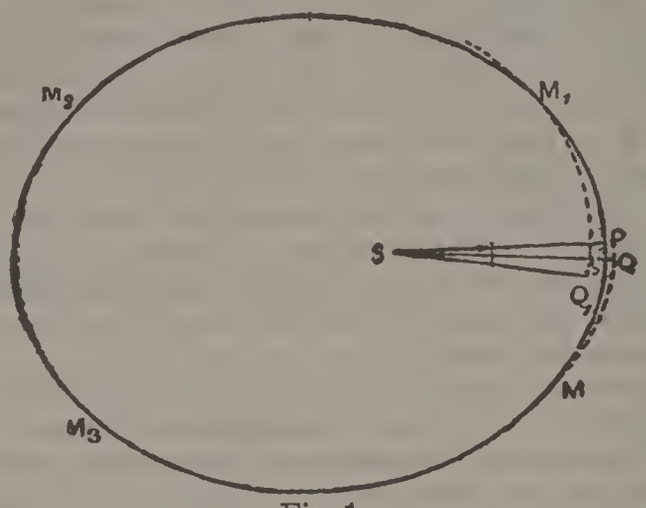


Fig. 1.

Next, consider a tangential accelerating force. Here the immediate effect is to increase the velocity at any point of the orbit, therefore to make it correspond to a larger orbit, consequently to a longer periodic time. Conversely, a retarding force, such as the resistance of a medium, diminishes the velocity at each point, and thus makes the motion correspond to that in an ellipse with a less major axis, and therefore with a diminished periodic time. This singular result, that the periodic time of a body is *diminished* by resistance, is realized in the case of Encke's comet; and this observed effect furnishes one of the most convincing proofs of the existence of a resisting medium in interplanetary space.

Again, the effect of a disturbing force continually directed toward the plane of the ecliptic is to make the node regrede. Thus, if N′N represent the ecliptic, NM a portion of the orbit, the tendency of the disturbing force at M is to make MQ the new orbit, and therefore N′ the node. Thus the node regredes, and the inclination of the orbit to the ecliptic is diminished, when the planet has just passed the ascending node. In Figure 3, let M_1 be a position of the planet near the descending node N_1. The effect of the disturbing force is to alter the orbit to MN_1'. Thus, again, the node regredes, but the inclination is increased. If NN′ and N_1N_1', in these figures, represent the earth's equator, the above rough sketch applies exactly to the case of the moon as disturbed by the oblateness of the earth. The reaction of

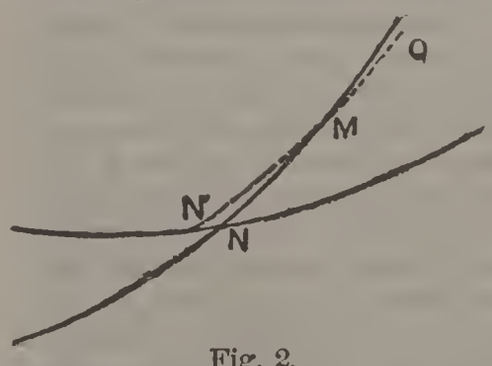


Fig. 2.

the moon on the earth gives rise to the Precession (q.v.) of the Equinoxes.

By processes of this nature, Newton subjected the variation of the elements of the moon's orbit to calculation, and obtained the complete explanation of some of the most important of the lunar inequalities: see MOON. Others of them—e.g., the rate of progression of the apse—cannot be deducted with any accuracy by these rough investigations, but tax, in some cases, the utmost resources of analysis. Newton's calculation of the rate of the moon's apse was only about half the observed value; and Clairaut was on the point of publishing a pamphlet, in which a new form was suggested for the law of gravitation, in order to account for the deficiency of this estimate, when he found, by carrying his analysis further, that the expression sought is obtainable in the form of a slowly converging series, of which the second term is nearly as large as the first. The error of the modern Lunar Tables, founded almost entirely on analysis, with the necessary introduction of a few data from observation, rarely amounts to a *second* of arc; and the moon's place is predicted four years beforehand, in the *Nautical Almanac*, with a degree of precision which no mere observer could attain, even from one day to the next. This is the true proof, not only of the law of gravitation, bnt also of the Laws of Motion (q.v.), on which, of course, the analytical investigation is based.

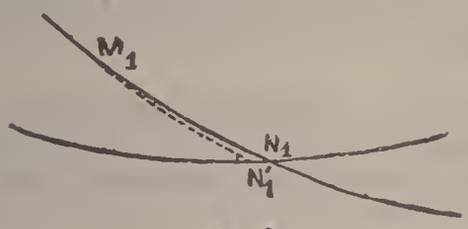


Fig. 3.

The mutual perturbations of the planets are divisible into two classes, *periodic* and *secular*. The periodic depend on the configurations of the system—such, e g., is the diminution of the inclination of the moon's orbit, after passing the ascending node on the earth's equator, above mentioned; or its increase as the moon comes to the descending node. The secular perturbations depend on the period in which a complete series of such alternations has been gone through, and have, in the case of the planets, complete cycles measured by hundreds of years.

A very curious kind of perturbation is seen in the *indirect* action of the planets on the moon. There is a secular change of the eccentricity of the earth's orbit, due to planetary action, and this brings the sun, on the average, nearer to the earth and moon for a long period of years; then for an equal period takes it further off. One of the effects of the sun's disturbing force being, as we have seen, to diminish, on the whole, the moon's gravity toward the earth, this diminution will vary in the same period as the eccentricity of the earth's orbit; therefore the moon's mean motion will be alternately accelerated and retarded, each process occupying an immense period.

With special reference to the planetary motions, it is noteworthy that the major axis of each planetary orbit is free from all secular variations; and those affecting the inclination and eccentricity are confined within small limits, and ultimately compensate themselves. These facts, clearly and beautifully demonstrated by Laplace and Lagrange, assure the stability of the planetary orbits, if we neglect the effects of resistance due to the interplanetary matter; which, however, must, in the long run, bring all the bodies of the system into collision with the sun, and ultimately stop the rotation of the sun itself.

Newton began the investigation of perturbations by considering those of the moon; Euler followed with a calculation of Saturn's inequalities; Clairaut, D'Alembert, and others successively gave those of the other planets.

It is well known that it was by observing the perturbations of Uranus, and thence discovering the direction of the disturbing force, that Adams and Leverrier were led to their great and simultaneous discovery of the planet Neptune.

PERTUSE, a. *pĕr-tūs'*, or PERTUSED', a. *-tūsd'* [L. *pertūsus*, perforated—from *per*, through; *tūsus*, beaten, hammered—from *tundo*, I beat: F. *perťuis*, a hole]: punched; perforated or pierced irregularly; in *bot.*, having slits or holes. PERTUSION, n. *pĕr-tū'zhŭn*, the act of piercing; the hole made; a perforation. PERTUSATE, a. *pĕr-tūs'āt*, in *bot.*, pierced at the apex.

PERTUSSIS, n. *pĕr-tŭs'sĭs* [L. *per*, thoroughly; *tussis*, a cough]: whooping-cough.

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